

TECHNOLOGY DEPT.

ROADS AND STREETS

OCTOBER, 1943

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METRON



Altitude 14,000 ft.

This is a section of the famous Pike's Peak Road in Colorado—reminiscent of the golden days of the automotive industry when Timken Bearing Equipped cars used to roar up the mountain in spectacular record attempts.

Keeping the road in good condition is no easy task, but the Austin-Western "99" Motor Grader equipped with Timken Bearings was making a first-rate job of it when this photograph was taken. Construction and maintenance equipment of all kinds does better work in less time at lower cost when equipped with Timken Bearings at every suitable point. The Timken Roller Bearing Company, Canton, Ohio.

Don't be
caught napping
after Victory. Be ready
to meet intensified com-
petition by redesigning
your equipment now,
using more Timken
Bearings.

TIMKEN

TRADE MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

ADAMS GRADERS

HELP TO PREPARE FOR THE BIG PUSH NORTHWARD



FROM AUSTRALIA

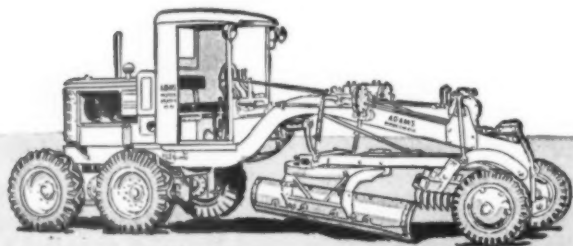
ALMOST DAILY we read of the exploits of allied forces in the recapture of Jap strongholds in the islands of the Southwest Pacific. These, of course, are but the "openers" of the big northern push towards Tokyo... To sustain this push it has been necessary to convert Australia into a big armed camp used as the base for tremendous forces of troops and quantities of materiel. This has called for the construction of many army camps, military roads and air fields. In this big construction pro-

gram Adams graders have had an important part... In many other parts of the world—in Alaska and the Aleutians, in England, in Africa, Sicily and the Near East, in Central and South America—Adams equipment builds facilities for the successful prosecution of the war... When peace comes, turn to your Adams dealer for tried and proven equipment.

J. D. ADAMS COMPANY, INDIANAPOLIS, IND.
Sales and Service Throughout the World

Adams

ROAD BUILDING • EARTH MOVING EQUIPMENT



Motor Graders • Leaning Wheel Graders
Elevating Graders • Hauling Scrapers • Etc.



**"I owe my
war job to
this road"**

Good roads are easing the manpower problem for many a war production plant.

Airplane factories, shipyards, can now draw workers from greatly expanded areas—from scattered, out-of-the-way communities, 30, 40 or more miles away. In share-the-car groups and buses, workers travel swiftly from their homes to distant working places over smooth, modern highways.

Made possible through far-seeing Federal and state policies during years of peace, America's highways are now playing a mighty role in the war effort. Communities by the thousand are completely dependent on the highway. Men and women who dwell in these communities use the highway to reach their jobs. Food and merchandise and mail come in, while farm produce and the products of local industries move out to their markets, over the highway.

Bethlehem Steel Company has had an important share in the construction of the nation's highway network. Bethlehem Reinforcing Bars and Mats, and Road Joints, embedded in the concrete, are preventing cracks and disintegration, despite heavy war-time loads. And Bethlehem Safety Beam Guard Rail and Steel Highway Posts are helping to keep whole army corps of war workers, as well as military convoys and war shipments, rolling along, fast and safe.



ROADS AND STREETS

Vol. 86, No. 10

October, 1943



A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; and to the construction and maintenance of airports.

WITH ROADS AND STREETS HAVE BEEN COMBINED GOOD
ROADS MAGAZINE AND ENGINEERING & CONTRACTING

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Service Decoration!

for better operation, proper
lubrication and adjustment,
skillful maintenance



That little red, white, and blue emblem is something for any construction man to be proud of. It's a sign that he's helping to conserve his particular piece of equipment, make it last longer, and still keep up the pace of wartime pressure jobs.

To help Lorain owners and operators to do that job, we have published a 24-page FIX-IT Handbook. It describes practical methods for making emergency repairs; tells how to renovate worn parts so they can be re-used efficiently; will save you time and money, too.

If you haven't received a copy of the FIX-IT Handbook, or if you want one or more free conservation emblems for your shovel, crane, tractor, or truck, clip this coupon and mail it today.

thew LORAIN
REGISTERED TRADE MARK

**CRANES • SHOVELS
DRAGLINES • MOTO-CRANES**



THE THEW SHOVEL CO., Lorain, Ohio
Please send me a copy of the
Thew FIX-IT Handbook.

Signed _____

Lorain Model No. _____

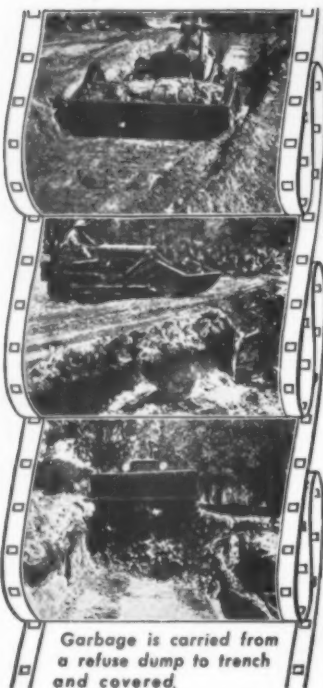
City _____

State _____ Serial No. _____

Also please send me _____ (number) of the colorful 5" red, white, and blue Conservation Emblems to display on my equipment.

WINS NEW RECOGNITION...

Drott Bull Clam Shovel



Garbage is carried from a refuse dump to trench and covered.



Always on the move with the tough, never-say-quit Marines — working on a variety of war jobs from coast to coast and overseas — now this versatile outfit receives NEW PERFORMANCE RECOGNITION!! Meets requirements to satisfactorily carry out Sanitary Fill method of disposing of refuse. Tried, tested and proved in Army camps...ideal for communities! Excavates trenches, compacts and covers refuse ... also grades and maintains site for use as recreational or parking space. Minimizes odor, danger of rats and germs. One of the handiest construction units available. Get all the facts. Wire, write or call.



Trench is dug, garbage dumped and covered with excavated material.

HOW IT WORKS!

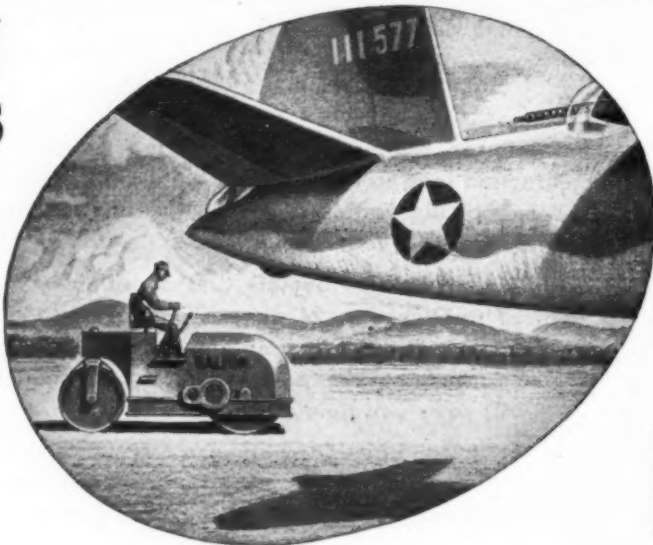
Digs starting trench to desired depth — later using the materials excavated to cover the refuse. When garbage is dumped the Bull Clam Shovel travels back and forth over it to secure compaction. After initial trench is made, it is a simple matter for the outfit to keep ahead of dumping operations — always using the material excavated for covering.



HI-WAY SERVICE CORPORATION

3841 W. WISCONSIN AVE., MILWAUKEE, WIS. • 739 MUNSEY BLDG., WASHINGTON, D. C.

GALION ENGINEERS



REALIZED LONG AGO

THAT ROAD MACHINERY would have to stand up under a lot of severe service—would have to meet high-speed requirements. Galion engineers built motor graders and road rollers accordingly. As a result, these Galion units are providing top performance on war-construction projects everywhere — helping to speed the final victory. Many road building programs will rely upon Galion after the war.

THE GALION IRON WORKS & MFG. CO.

Main Office and Works: Galion, Ohio

HANSON

ENGINEERING ABILITY

HAS BEEN UTILIZED FOR SPECIALIZED WAR NEEDS
DURING THE LAST THREE YEARS

★ ★ ★ ★ ★

WE AT HANSONS ARE PROUD

To have furnished special cranes to our Navy for many of its Mine Laying Ships and Destroyers.

For whenever our Marines land on a new stepping stone, there the Hanson M. T. Crane is doing its varied duties.

That on our Army battlefronts all over the world, there you will find the Hanson Heavy Duty Machinery Trailers.

★ ★ ★ ★ ★

ON OUR HOME FRONT

You will find Hanson's Crawler and Truck Mounted Excavators and Cranes operating "around the clock" building roads and runways, in the pits and quarries, in mining enterprises and in handling materials of many kinds. Hanson Friction Clutches are being used on essential direct drive machinery and our Marine Type Friction Clutch is doing double duty on small ships in all parts of the world.

★ ★ ★ ★ ★

YES, that is why Hanson equipment and repairs are hard to obtain. That is why we ask Hanson equipment owners to thoughtfully take care of their present equipment, ordering only necessary new parts which can be shipped promptly from our factory.

★ ★ ★ ★ ★

We have not lost sight of the future—the World of Tomorrow—we are continuously planning and developing new and better equipment for that time when you will want the latest and best in Excavators, Cranes, Machinery Trailers, and Friction Clutches and you can obtain them from Hanson.

The HANSON CLUTCH & MACHINERY CO.

Phone 417

Tiffin, Ohio

INSURE YOURSELF FOR THE FUTURE • BUY WAR BONDS NOW

ROADS AND STREETS, October, 1943

Dependability of CP Compressors



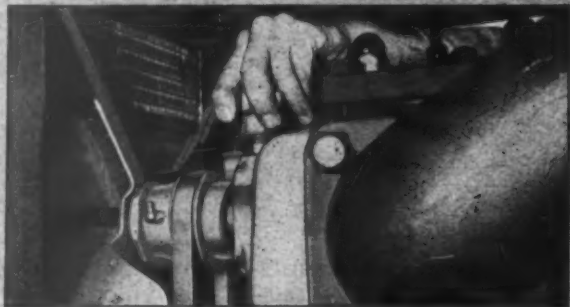
MAINTAINED BY CARE

CP Portable Compressors are dependable and economical. They require little maintenance, but some fundamental precautions are essential to keep them at their best. They must be kept clean and lubricated. Three simple but important maintenance operations are illustrated below.

HOW TO GET MAXIMUM SERVICE FROM YOUR COMPRESSORS



Every eight hours, drain receiver and intercooler to remove condensate and oil. Prevents freezing and helps to keep moisture out of tools.



Adjust fan belts, just tight enough to prevent slipping, or excessive discharge temperatures and increased consumption of gas will result.



Blow out radiator and intercooler fins frequently with air hose. Never scrape off dirt with tools as damage to fins would result. Clean regularly.

★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
(Micycle...Universal)
ROCK DRILLS

CHICAGO PNEUMATIC
TOOL  COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

Baker Hydraulic Bulldozer Performance Is Always Front Page News!

Bakers are "battling" bulldozers judging from the reports coming from the fronts via newspaper and news-reel. The Baker's simple hydraulic system is easy to maintain and operates in any weather or temperature. The direct lift and full down pressure on the blade gets more dirt moved faster. That's why the Allies can build landing strips, repair bombed roads, and clear blitzed cities of debris with so much speed. Speed that will soon have the Axis hanging on the ropes!

Send for "Unsung Heroes of War"—depicts many wartime jobs—and a copy of Catalog 834-A.

THE BAKER MFG. CO.

"If it concerns Victory, it concerns us"
306 Stanford Ave. Springfield, Ill.

DAILY TRIBUNE: JUST BEHIND THE DOUGHBOYS ARE THE BULLDOZERS

BY CLAY GOWRAN.
(Chicago Tribune Press Service.)
WITH U. S. INVASION FORCES
ON NEW GEORGIA, Aug. 3 (Delayed).—Marking time in a mud-drenched bivouac area behind the combat lines on New Georgia is a little group of men whose work will just begin the day the major fighting for Munda point airfield ends. They are the construction experts who, "as soon as we can put in our equipment without having it blown apart," will undertake the tremendous job of making the island ready for use of American troops. Working day and night.

U. S. ENGINEERS BUILD MIRACLE ROAD IN 3 DAYS

WITH THE AMERICAN ARMY IN NORTHERN SICILY, Aug. 9. (Delayed).—(AP)—American combat engineers helped to the German defenses at the gateway to Randazzo by the miraculous feat of building a mile supply road in three days on a mountain goat. "There was no road, footpath—in the area to traverse, and when the road crossed 13 a number of people said Capt. Alex. Keesport, Pa. "Cut May It was near C. from near C. to, west of the town, route from the north. First guns. Yesterday, they completed the construction of a 3,000 foot fighter plane runway gouged out of an abutment. The bulldozers were the main detecting party. We put two big bulldozers to work one to break a rough road and pushing big boulders aside. After that we put two lighter bulldozers out to dress up the road. Each bulldozer was protected by armored half-tracks to keep off enemy planes. Pick and shovel crews helped out. "We were ahead of the Infantry

CHICAGO DAILY TRIBUNE: YANKS BUILD AIR FIELD IN 10 DAYS ON NEW GEORGIA

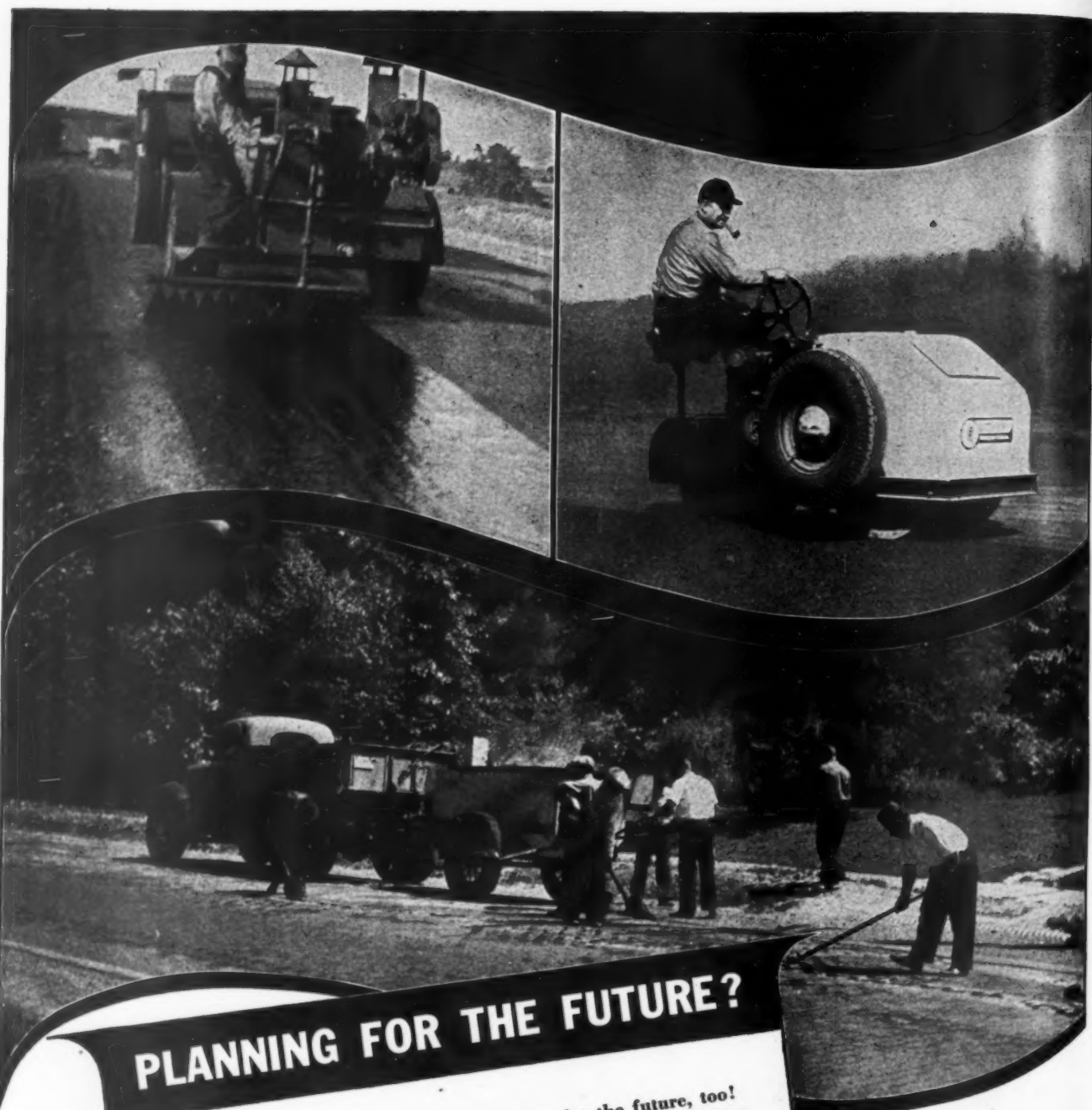
3,000 Ft. Runway Made
Out of Plantation.

BY CLAY GOWRAN.
(Chicago Tribune Press Service.)
WITH U. S. ARMY ON NEW DOVA ISLAND, July 11 (Delayed).—A miracle of military construction has been accomplished in the muddy sink hole which is Segi plantation at the southeastern tip of New Georgia Island. Units of the naval construction battalions landed at Segi on the dawn of June 30—the day the New Georgia offensive opened. They came ashore with bulldozers, power shovels and trucks in addition to landing. Yesterday, just 10 days after construction of a 3,000 foot fighter plane runway gouged out of an abutment. The bulldozers were the main detecting party. We put two big bulldozers to work one to break a rough road and pushing big boulders aside. After that we put two lighter bulldozers out to dress up the road. Each bulldozer was protected by armored half-tracks to keep off enemy planes. Pick and shovel crews helped out. "We were ahead of the Infantry



BAKER

The Modern Tractor Equipment Line
for
EARTH MOVING
LEVELING AND GRADE BUILDING
SNOW REMOVAL
ROAD MAINTENANCE



PLANNING FOR THE FUTURE?

Let's not forget the present—still let's plan for the future, too! Our vital transportation system calls for the construction of new Highways, Roads, Streets, and the repair of our present system, so be prepared—plan to purchase your Littleford Black Top Construction and Maintenance Equipment after Victory. Pave the Road to Victory first, pave the Roads later.

Upper Left: Littleford No. 101 Utility Spray Tank
 Upper Right: Trall-O-Roller
 Bottom: 84-HD Kettle





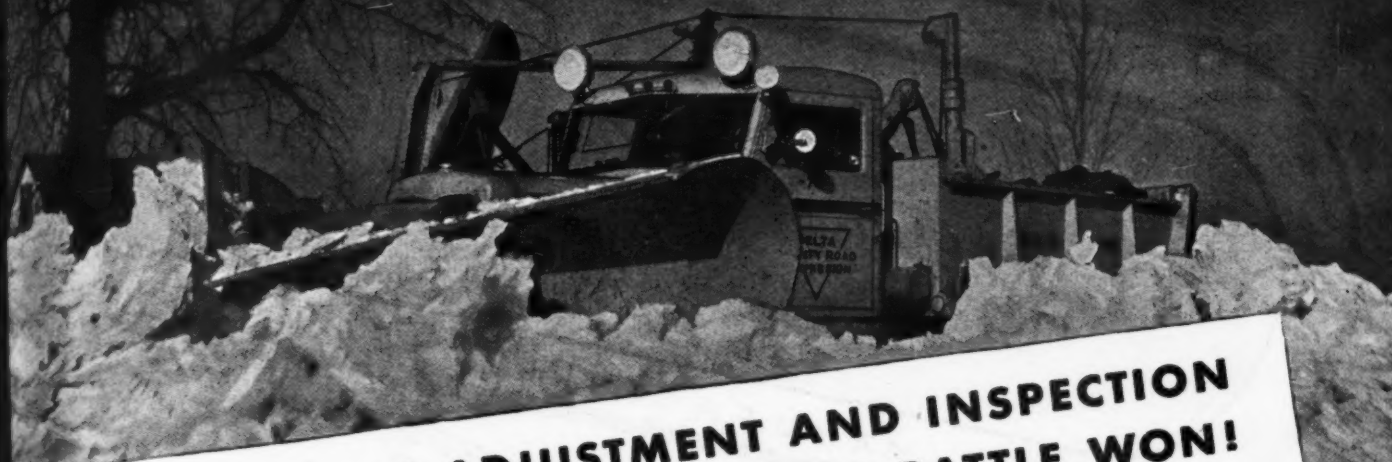


LITTLEFORD

LITTLEFORD BROS., INC.
 454 E. Pearl St., CINCINNATI, OHIO

Snow Clearing

... THE BIGGEST JOB OF THE YEAR IS JUST AHEAD



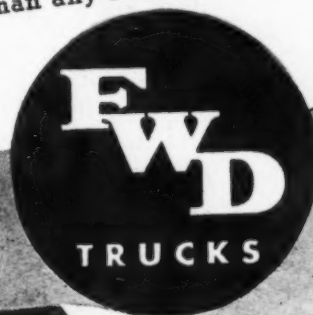
NOW PERIODIC ADJUSTMENT AND INSPECTION ... IS HALF OF WINTER'S BATTLE WON!

Preventive maintenance — the periodic check-up and mechanical adjustment that keeps trucks in tip-top condition — is more important than ever right now. For the toughest chore of the year — snow removal — lies just ahead.

Even though your FWD's are busy with maintenance work, take time for the periodic inspection and adjustments that mean so much in truck conservation. Study your "Operation And Maintenance Manual"; start to prepare your FWD's for winter operation now; see your FWD branch or dealer for maintenance advice and practical suggestions on how to get the most

out of your FWD's in snow removal service. Open highways and airports are vital to the war effort. Put your FWD's in condition to meet toughest challenge of the year — winter's "blitz" of heavy snow.

First choice for the fastest, lowest in cost, most effective method of combating snow, is the FWD truck. More different kinds of snow plows are mounted on FWD trucks than any other make of truck or tractor.



Preferred
FOR FAST LOW COST
SNOW CLEARING



THE FOUR WHEEL DRIVE AUTO CO., CLINTONVILLE, WIS.

Canadian Factory: Kitchener, Ontario



MANUFACTURER

War Brings a New Appreciation of Dealer Service

NEVER AGAIN will the wartime user of construction equipment, who has had firsthand contact with the varied services rendered by the Equipment Distributor in these days of priorities and shortages of machines and parts, take for granted the importance and value of those services.

Because he was properly geared-up in times of peace, the distributor and the members of his shop and field forces have been able to make a major contribution to the success of a program of construction for war such as no country has ever undertaken.

It has been said that America has solved the problem of low-cost production of machines and goods, but that the problem of efficient, economical distribution remains. We sincerely believe that this is not true of the construction equipment industry, where the Distributor has enjoyed the confidence of his customers in times of peace; has more than justified that confidence during these troubled and uncertain times, and will continue to justify it after the Peace is won, and he can again become a Sales as well as a Service Engineer...and resume his complete function as the vital link between manufacturer and user. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois, U. S. A.

THE VITAL LINK



BUILDERS OF ROAD MACHINERY
Austin Western
SINCE 1859





**WATCH FOR
THE SIGNS**

12 ton crane; or 10 ton crane fully convertible to 1/2 yard shovel, trench hoe or dragline—"ready for the road"—and the next job. All MICHIGANS have fingertip AIR CONTROLS.



When the desirable jobs "break", be prepared to secure your full share. The time to consider new equipment for handling these projects is NOW.

When it comes to mobile Shovels and Cranes, the veteran air-controlled MICHIGANS stand out in front with their high mobility plus rugged stamina, convertibility plus ease of operation.

There's vast CONSTRUCTION AHEAD—Watch for the signs—and be ready with MICHIGANS.

GET THE FACTS NOW—

Write, wire or phone for Bulletin RS-103.


MICHIGAN
POWER SHOVEL CO.
BENTON HARBOR, MICHIGAN



THE TRUCK WITH THE **PLUS QUALITY** FOR THE MOST DIFFICULT SERVICES

Why do the men in the armed services of our own, and other countries, prefer Marmon-Herringtons, so generally, for the extra-difficult jobs? Possibly because Marmon-Herrington *All-Wheel-Drive* trucks are *not war babies*, having had the "bugs" worked out in more than ten years of manufacture before the war began. Marmon-Herrington led the industry in improving the design and performance of heavy-duty multiple-drive trucks, following the first world war. It was

Marmon-Herrington, too, that originated the conversion of standard mass production trucks and passenger cars (forerunners of the modern Jeep) to *All-Wheel-Drive* years before the present war started. Naturally, these pre-tested vehicles provided superlative performance from the start, and endeared themselves to thousands of men who will demand the same "plus qualities" in the trucks they drive when the war is over. Their assurance will be the name, Marmon-Herrington, when they buy.

WHAT HAVE YOU DONE FOR VICTORY TODAY? BUY WAR SAVINGS BONDS

MARMON-HERRINGTON

All-Wheel-Drive

MARMON-HERRINGTON CO., Inc., INDIANAPOLIS 7, INDIANA

Cable Address: MARTON

DRAGLINES

CRANES

Machines THAT GET
ON WITH THE BUSINESS OF
WINNING THE WAR

MARION

SHOVELS • DRAGLINES • CRANES
CLAMSHELLS • PULL-SHOVELS • WALKERS

From 3/4 cu. yds. to 35 cu. yds.

THE MARION STEAM SHOVEL CO.
MARION, OHIO



SHOVELS

CLAMSHELLS

HERE'S A FIGHTER THAT CAN HELP



HAVE you ever thought of your Cletrac dealer as a "fighter" who can help you keep your fighting equipment fit to fight?

Your Cletrac is a fighting machine—to be kept in fighting trim by frequent inspection, correct lubrication and proper tune-up.

Doubtless you know your Cletrac dealer pretty well, but have you kept in touch with him in the war-time maintenance of your Cletracs?

Here's how your Cletrac dealer stands ready

to help you get the most from your equipment:

1. Assist you in making out the necessary forms required under government regulations to secure any vital repair parts.
2. Supply trained, expert service men who will aid you in maintaining and repairing your Cletracs so that they provide dependable, economical performance.
3. Give you the benefit of his years of experience in sound advice, and help you do what often seems impossible in keeping equipment working.

You'll find, too, that he carries an adequate stock of parts as war conditions permit.

THE CLEVELAND TRACTOR COMPANY • CLEVELAND, OHIO

CLETRAC CRAWLER TRACTORS

GASOLINE OR DIESEL



POSITIVE CONTROL BOOM OPERATION

Boom Raising and Load Hoisting While Swinging

On war project construction or in the combat areas, Koehring Cranes are saving valuable seconds. Production counts today more than ever. Peak production is maintained on construction jobs where Koehring Cranes operate. With positive control every move is a faster move . . . every move is a production move. If you have a Koehring Crane, keep it in good operating condition until they are again available for post-war construction. All present operating features plus many improvements will again give you peak production at minimum operating costs.

KOEHRING COMPANY

Milwaukee, Wisconsin

DEPEND ON YOUR KOEHRING DISTRIBUTOR

to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.



HEAVY-DUTY CONSTRUCTION EQUIPMENT



For the Roads of the future and the Tools to build them

While you are laying your plans for an improved system of highways after the war and are figuring out the details to build them . . . the construction equipment industry, now working for Victory, is also planning for Peace—that you may be able to build better roads at lower cost.

Many of the new materials, now being developed, will be used to the fullest extent in new machines — giving you greater strength, less upkeep. New methods of manufacture will provide a bigger dollar-for-dollar value. Experiences of war—toughest testing ground for any machinery—will be turned to your advantage in better overall construction. You will have a more complete line of equip-

ment to choose from—units that will more closely fit your requirements. Earth will be moved faster than ever before . . . with greater economy.

All these things will not happen the day the war ends. It will take time to change over from “all-out” war production — to thoroughly test new models, re-tool plants and assemble materials. But the job will be hurried . . . as fast as practically possible.

Allis-Chalmers research engineers, always alert to new trends and developments, have their ears to the ground and their eyes on the future, to provide you with the best equipment available . . . that your construction program may go forward in full stride.

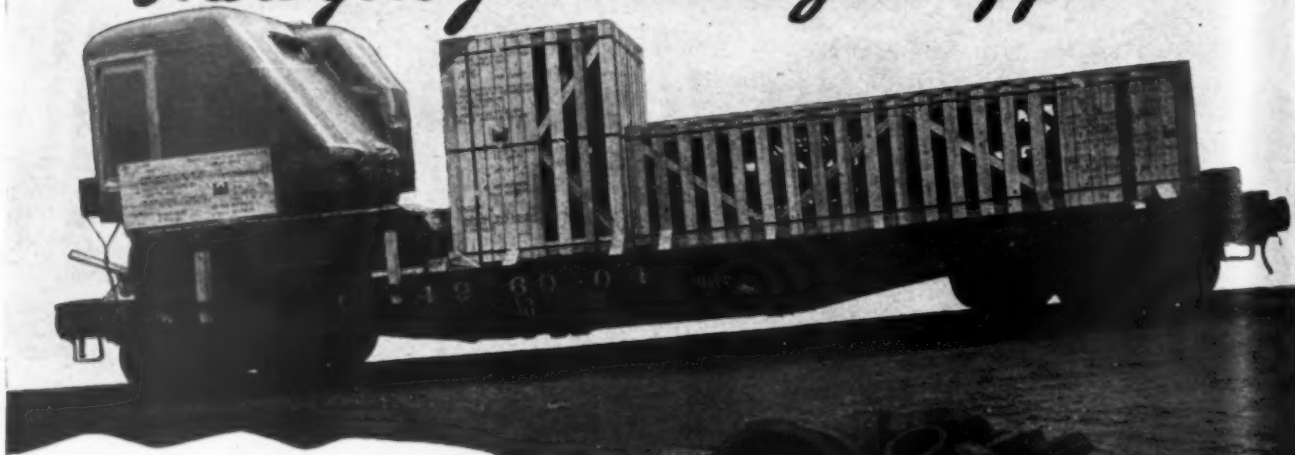


ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE, U. S. A.

JOIN THE INVASION . . . BACK THE ATTACK . . . BUY MORE WAR BONDS

There goes Your Buckeye Clipper-



It's Off to Win the War!

The Buckeye Clipper's familiar silver color with the red streamlines on the sides has given way to olive drab and battleship gray—they're coming through the Buckeye paint shop that way these days. Yes, Clippers have put on the war paint!

Having passed the "knock-down and drag-out" tests that military men put them to (tougher than any normal peace-time job), Clippers are rolling off to war on all fronts just as fast as we can build them—and that's many times faster than ever before. So, when the Axis takes the count there'll be plenty of Clippers for those who want vacuum power control, automatic swing brake, dual right angle power take-off and the 21 other features that made the Clipper a stand-out before the war—features that are now helping win the war!

Send for the booklet, "The Age of Clippers."

BUCKEYE TRACTION DITCHER CO.
Findlay, Ohio

$\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ yds.
with Mevac Vacuum
Power Control.
Quickly convertible
to trench hoe, crane,
dragline or pile
driver.

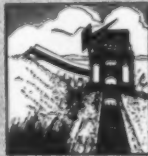


Check ad page 26.



Buckeye✓

CONVERTIBLE SHOVELS, TRENCHERS AND BACKFILLERS, TRACTOR EQUIPMENT, R-B FINEGRADERS, ROAD WIDENERS AND SPREADERS





The International TD-18 Diesel TracTracTor "on the march"... to bring Victory closer and to speed the day when big crawlers like this can resume the reconstruction jobs of Peace.

Riding on to War – and VICTORY with INTERNATIONAL TracTracTors

THE RUMBLE of America's motorized equipment grows louder and louder as the Allies press home the attack on battle fronts all over the world. It's "Onward, Mechanized Soldiers," with International TracTracTors joining in the March to Victory.

These big crawlers of the Armed Forces are giving the same superior performance that civilian TracTracTors are providing at home. That's one reason why there are so many of them in the Service. They are *doing the job*. They have the ruggedness, stamina, and the dependability it takes for the heavy-duty, push-

and-pull jobs of war... both here and abroad.

With so many TracTracTors needed by the Armed Forces, there naturally are fewer available for civilian use. Your present TracTracTors will probably have to last for the duration. This calls for watchful, eagle-eye attention to care and maintenance. Make International Service—available at well-equipped, well-manned International Industrial Power dealers' shops—your ally in keeping your equipment working.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

Buy War Bonds... Save and Serve America

INTERNATIONAL POWER



© 1943 Great American Industries, Inc., Meriden, Conn.

Any way you figure it—if your trucks have special jobs to do they should be *special trucks*, engineered from bumper to bumper for their particular assignment. Such motor trucks do

more useful work per day, at a lower cost, and with longer life.

The Ward LaFrance name on your trucks stands for equipment specially created by a manufacturer of highest standing, for the job it is intended to do.

Many users of stock model vehicles will be surprised to learn about the advantages which could be obtained from a specially engineered and built Ward LaFrance fleet. Investigate now — it's none too soon.



Heavy Wrecker M1

● A prime example of trucks built for the job, are the heavy wreckers being built by Ward LaFrance for the Army. They are used for tank recovery work and other recovery operations.

WARD LAFRANCE TRUCK DIVISION

ELMIRA,



NEW YORK

VINSOL TREATED CEMENT SCORES IN ARMY TESTS !...

see below

**concrete beams . . .
stronger now than
when installed.**

TREAT ISLAND, MAINE . . . A remarkable improvement in the frost-resistance and toughness of cement can be achieved by adding small amounts of Hercules Vinsol* Resin, army tests demonstrate.

Conducted by the Corps of Engineers, U. S. Army, the tests were started three years ago with 273 test beams of various types of concrete, installed on Treat Island, Maine. During the winter months, the best beams were subjected to alternate freezing by Maine winds and thawing by salty flood tides. Although all of the normal-cement concretes deteriorated rapidly under this gruelling treatment, the Vinsol-treated cements *not only remained intact, but are actually stronger today than when originally installed.*

FOR RUNWAYS, HIGHWAYS . . . Vinsol-treated cement has been found exceptionally effective for runways and highways—both for improved frost resistance and for successful checking of scaling caused by chloride salts in modern ice-cleaning methods. Technical information on Vinsol, and requirements for all vital construction, are available from Hercules. Write in, today.



0.05% VINSOL, MAXIMUM . . . Although only 0.05% of low-cost Vinsol was used in the army tests, as little as 0.025% of Vinsol is being used in many cases. Introduced during the clinker-grinding operation, the Vinsol improves not only frost and scaling resistance, but also plasticity and workability of the cement mixes.




 NAVAL STORES DEPARTMENT
HERCULES
POWDER COMPANY
 INCORPORATED
 972 MARKET STREET . . . WILMINGTON 99, DELAWARE

EL-102

**FUNCTIONALLY
UNCHANGED
BY WAR**



While the demands of war may cause some changes and substitutions of critical materials in the interest of conservation, we are proud to say that the DIETZ LANTERNS are functionally the equal of pre-war production.

Same candle power, same operation, same control of flame, same economy and long life.

Substantial demands for direct government use of DIETZ LANTERNS in Army, Navy and other war time departments naturally come first, and we regret any delays in deliveries to our long-time friends and customers. We are doing the very best we can.



R.E. DIETZ COMPANY
1840 NEW YORK 1943

Output Distributed Through the
Jobbing Trade Exclusively



VITAL TRAFFIC MUST GET THROUGH SAFELY THIS WINTER!

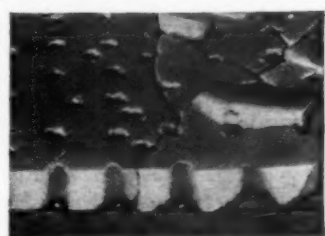


It's your responsibility—your share in the war effort—to see that storms don't delay trucking of war supplies. But in your battle to keep highways and streets open you have a sure ally in Sterling "Auger-

Action" Rock Salt. Applied at the beginning of a storm, it will keep the snow from packing and bonding to the pavement—makes complete removal easy. Keeping pavements bare this way is safest. Tests show that it takes 2½ to 7 times as long to stop a car on ice as on bare pavements!

If caught by a storm

... and the snow has already packed down hard, you can still count on the efficiency of Sterling Rock Salt. Just as you see it in the model here, Rock Salt digs in fast. It melts the snow and ice, forming a brine which loosens the bond between pavement and ice. Thus loosened and honey-combed, the snow and ice can easily be removed. Further, when Straight Rock Salt is used, it eliminates the cost of cleaning streets and catch basins which ordinarily become clogged with sand and cinders during thaws!



Sterling

"Auger-Action" ROCK SALT FOR ICE PREVENTION

Write today for bulletin containing all the facts on the most efficient and economical solution to your ice prevention problems. Free consultation with an International Field Engineer upon request. International Salt Company, Inc., Dept. P. W. 10, Scranton, Pa.

After grading and windrowing
WOOD ROAD-MIX methods of pavement construction
 require only these three operations . . .

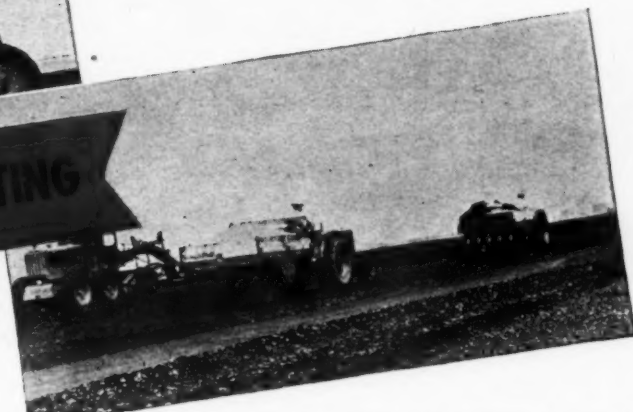
1. ONE-PASS MIXING



2. SPREADING



3. COMPACTING



Basically there are five operations in the Wood Road-Mix method of pavement construction: Grading, windrowing, mixing, spreading and compacting. The last three operations, namely, mixing, spreading and compacting, determine the amount of production of finished material, speed of completion of the job, and the quality of the paving.

With the Wood Roadmixer you get *One-Pass* mixing, followed *within minutes* by spreading and compacting. Production exceeds 250 tons per hour per eight-hour day, using either emulsions, road oil or soil cement. The quality of the finished paving equals or excels that produced by any other method.

In addition to the advantages of *One-Pass Mixing*

the Wood Roadmixer is lower in first cost, lower in operating cost and lower in maintenance cost than any other proven mix-in-place equipment.

Wood Roadmixer is the pioneer and leading traveling plant method of pavement construction. Its daily record of speed, quality and economy is proving to an increasing number of engineers and contractors that the modern method of pavement construction is the Wood Road-Mix method, using the Wood Roadmixer.

With proper priority and WPB release we can ship you a Wood Roadmixer today. Write or wire for literature and costs.



DESIGN FOR

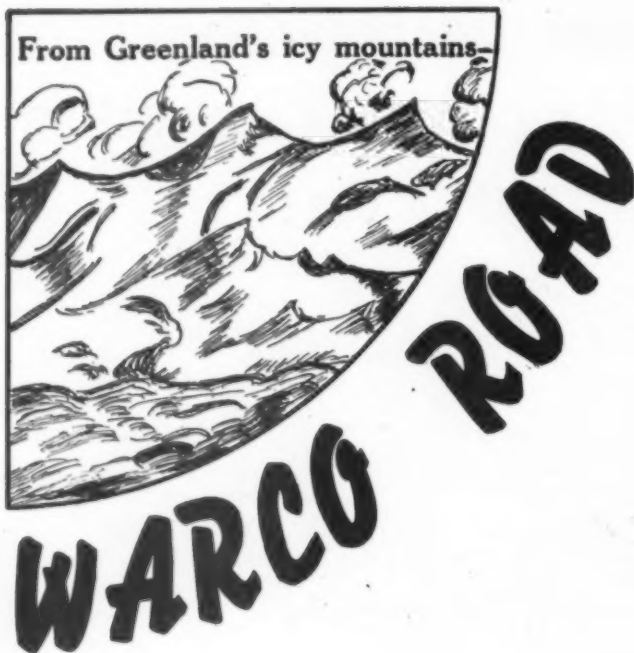
ROAD-MIX



Write for detailed and illustrated Wood Roadmixer bulletin, "The Fastest Method of Low-Cost Paving."

WOOD ROADMIXER

Wood Manufacturing Co. • 816 West 5th St., Los Angeles 13, California



MACHINERY

HAS MET THE TEST IN TIME OF WAR

The war is not won. Many more hard battles must still be fought. Until the Peace is established, WARCO will continue to furnish equipment for the Armed Forces. In WARCO Road Machinery has been developed the stamina necessary to withstand the rigors of modern warfare.

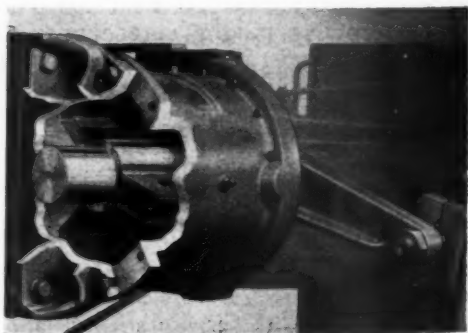


MODEL VD-140 HYDRAULIC CONTROL MOTOR GRADERS

WARCO pioneered the first hydraulic grader known. Since then constant improvement and advanced engineering have made current models second to none on the market. A choice of sizes in medium and heavy machines, all with fast and easy action through hydromotor control, assures users of the RIGHT motor grader for ANY job. Simple but sturdy construction has produced machines with little to wear out.

THE HYDROMOTOR IS SIMPLE, FAST, POSITIVE

Everyone knows how easy it is to throw a light switch. That's the way the controls work on the motor graders equipped with hydromotors. A slight pressure releases tremendous force with little operator effort. Any kind of road job can be done with precision. Investigate Hydromotor Control. It spells progress in motor grader construction.



For several years there has been an apparent need for a practical, light weight maintainer, that was not just a makeshift to a ready-made tractor. Such a unit will be available in our new, light-weight Power Maintainer, engineered from the ground up to be a good, practical road maintaining tool, designed to do a real job and sell at an attractive price.

Terracing and ditching for soil reclamation, conservation and irrigation looms large in post-war planning for an America that must feed the world. Reconditioning and maintaining thousands of miles of roads faces the Nation's Highway Departments. WARCO will have a time-tested, tough WARCO-DUPLEX Terracing Grader, which can do this work at the lowest known cost, a light pull grader that is built right and priced right.

Watch for detailed announcement on these machines.

A FEW TERRITORIES NOW OPEN TO DEALERS AND DISTRIBUTORS

WARCO-DUPLEX HYDRAULIC SCOOPS

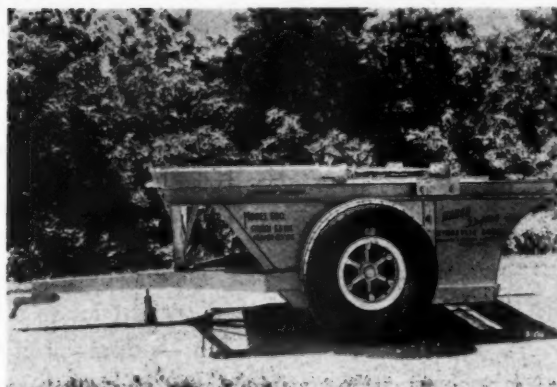
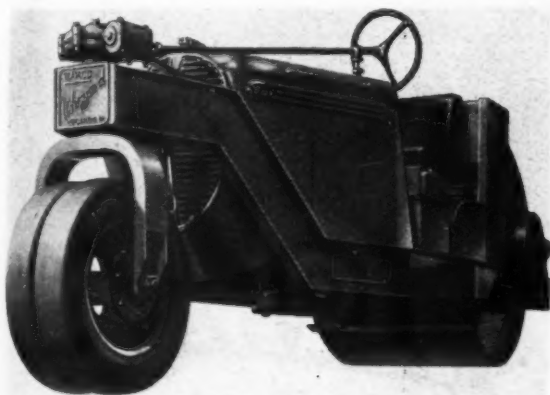


4-WHEEL HYDRAULIC SCOOPS

A scoop of simple design and construction. Also built in 3 and 5 yd. sizes. Time-tested, efficient, WARCO-DUPLEX Hydraulic Scoops afford quick, flexible action. They offer rear ejection and controlled spreading, and above all, are easy loading. With ideal short wheel base scoops work in confined areas with fractional inch control for cutting and spreading. Engineered for use behind 35 to 75 H.P. tractors. Unsurpassed for road building, finishing and ditch excavation.

WARCO "WHIZZARD" ROLLER

With thousands of miles of roads developing pot-holes and ruts, a time is coming when speedy, economical repair will be a necessity. The WARCO "Whizzard" affords paramount performance in rolling and speed of transportation between jobs.



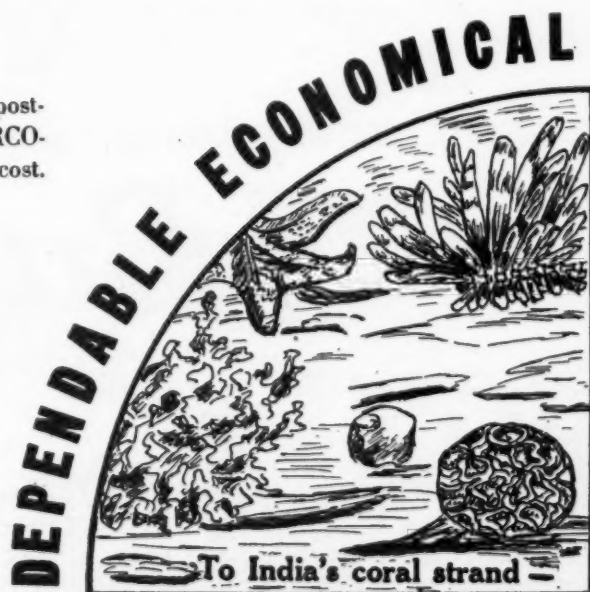
2-WHEEL HYDRAULIC SCOOP

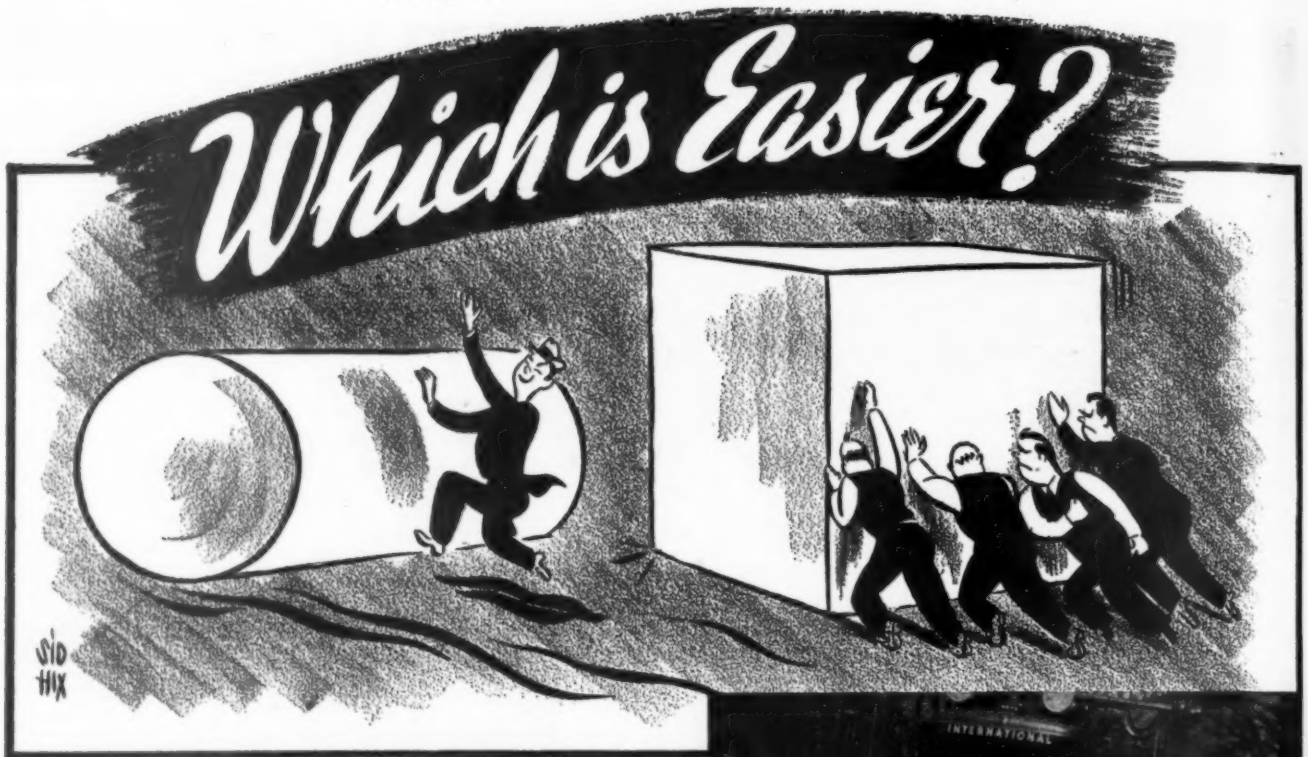
2-Wheel models in 3 to 5-yd. capacities available for close quarter cuts and fills. These combine all features of the 4-Wheel type, plus easy maneuverability. Forward loading and rear ejection, with extremely short turning radius, make them machines par excellence for dumping over embankments.

As an aftermath of war, economy must be the watchword in post-war construction. For the smaller dirt-moving jobs the WARCO-DUPLEX Rotary Scraper will fill the bill efficiently at low cost. Watch for detailed announcement.

Now, only very high priority can obtain these machines. We all know that some day we can again fill your orders for WARCO Equipment, best in the long run.

**W. A. RIDDELL
CORPORATION
BUCYRUS - OHIO**





BUCKEYE Bulldozer and Trailbuilder moldboards roll the dirt. That means more capacity and more yardage in less time than if your tractors had to doze a dead weight load.

Buckeye blades are big — appreciably larger than many others because their proven ability to roll the dirt makes possible bigger loads with the same tractor power. Buckeye Trailbuilder moldboards, considerably greater in area than Bulldozer boards, are being successfully used in the straight-on or bulldozing position a great percentage of the time by many owners.

In the future, when you are buying dozers, remember Buckeye's moldboard curvature that really rolls the load.



Remember
BUCKEYE

for moldboards
that
ROLL the load!

BUCKEYE TRACTION DITCHER CO., Findlay, O.

Check ad page 18.

Built by **Buckeye** ✓

Convertible Shovels



Trenchers



Tractor Equipment



R-5 Finegraders



Road Wideners



Spreaders





Pat. No. 2,280,275—April 21, 1942

REMOVE THE DANGER FROM SNOW PLOWING

Find out how Keystone Snow Plow Lights are making snow plowing safe. Hundreds of highway officials have found the answer.

Put these strong, weatherproof, easy to see warnings on your equipment and stop accidents.

We Can Deliver

AUTO GEAR & PARTS CO.

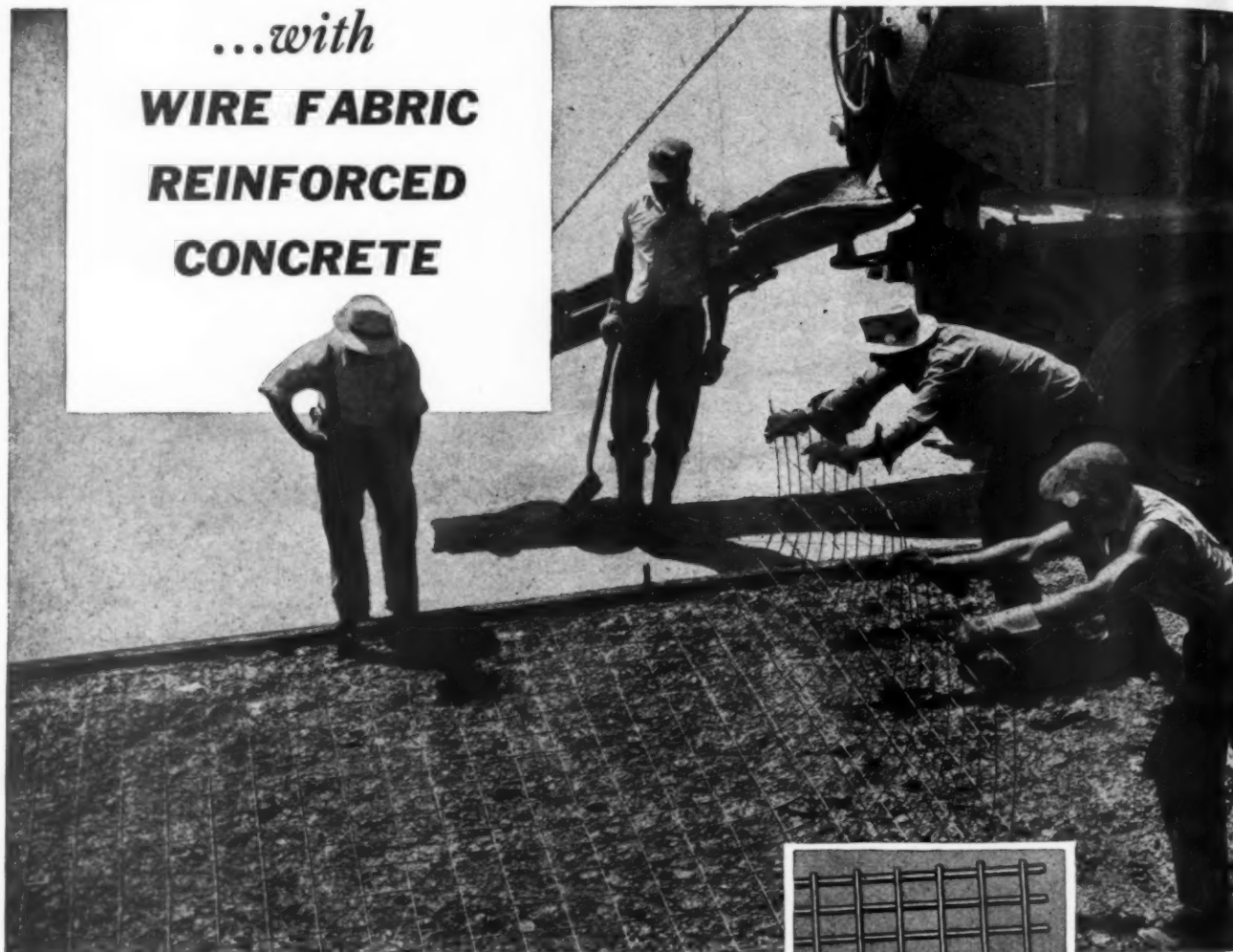
1410 W. HUNTING PARK AVE.
PHILADELPHIA 40, PA.



ROADS AND STREETS, October, 1943

BETTER HIGHWAYS FOR AMERICA'S FUTURE

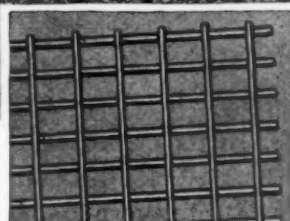
...with
**WIRE FABRIC
 REINFORCED
 CONCRETE**



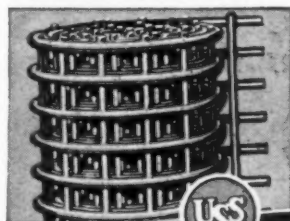
THE tremendous war-time loads that are rolling over America's highways are proving the ability of wire fabric reinforced concrete roads to take terrific punishment. And they are convincing evidence that wire fabric will be a wise choice to preserve the smoothness of roads built for the future—and to protect the investment in them.

There's good reason why wire fabric adds to the useful life of pavements. Cracks that may form are structurally harmless because the closely-spaced, high-yield-point reinforcing steel controls the crack by holding the faces of adjoining slabs formed by the crack in tight interlock. This enables the two crack edges to deflect simultaneously rather than independently, thereby preventing the concrete from becoming overstressed at crack edges.

To safeguard the highways of the future, give them the extra durability of steel. Specify wire fabric reinforcement for concrete construction.



IN SHEETS . . . OR IN ROLLS



**AMERICAN
 ELECTRIC WELDED
 WIRE FABRIC**

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

*Columbia Steel Company, San Francisco, Pacific Coast Distributors
 United States Steel Export Company, New York*

UNITED STATES STEEL



—AND STILL AVAILABLE TO YOU!

GOOD NEWS for snow plow operators! Blackhawk Power-Packer Hydraulic Controls are available to you on proper priority, for use on your present equipment.

And, when specifying Blackhawk Controls, have added confidence in knowing that Blackhawk Power-Packers are not only "service proved" in annual battles with Old-Man Winter — but are now "battle proved" in today's war with the Axis!

Originally designed to serve snow plows — the Power-Packer pump is now used on important war equipment, such as recharging the recoil mechanism of big mo-

bile guns. The speed, simplicity, dependability and all-weather function of the Power-Packer made it a happy answer in replacing a complicated foreign-type pump having almost three times the number of parts.

Power-Packers are built today to serve both war equipment and your snow plows. WPB recognizes the importance of keeping highways, streets and airports open. Efficient war-time snow clearance demands dependable snow plow equipment — with hydraulic controls that will help fight your battle this coming winter.

A Product of BLACKHAWK MFG. CO., Dept. RS, Milwaukee, Wisconsin



BLACKHAWK

Hydraulic Equipment



"Superhighways" — high speed transcontinental roads with grade separations and underpasses are post-war necessities. Their need is dictated by the requirements of millions of civilian automobiles returning to unrestricted use, growing truck shipments, bus travel and in emergencies to facilitate high speed movements of military units.

Engineers and contractors faced with this tremendous task already have many of their plans on the drafting board. Safety requirements have led many to specify *Keystone Mastic Board Center Strip* for both longitudinal and transverse joints. The special tongue and groove joint allows for normal expansion and contraction, preventing buckling and "blow-ups". Made from ageless asphalt and mineral fillers, this joint is rigid, waterproof and flexible.

You, too, may find it to your advantage to discuss your paving plans with our engineers and technicians.



• To help you in your plans, write for Keystone's Paving Products Catalog containing complete specifications. Sample joints are available on request.

Keystone
ASPHALT PRODUCTS CO.

A DIVISION OF THE AMERICAN-MARIETTA COMPANY

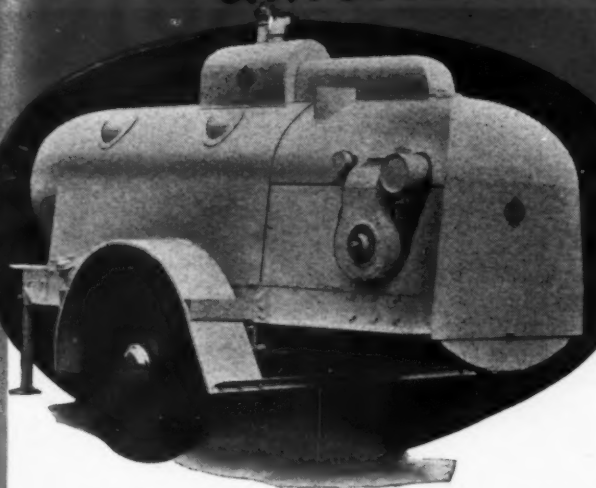
GENERAL OFFICES • 43 EAST OHIO STREET • CHICAGO

High Pressure Steam

QUICKER AND IN QUANTITY!

FOR

- ▶ Heating Tank Cars
- ▶ Thawing Frozen Culverts
- ▶ Heating Concrete Aggregates
- ▶ Operating Steam Pile Drivers



FULL PRESSURE IN 20 MINUTES FROM A COLD START!

The Bros Tank Car Heater delivers more hot, dry, steam . . . with instant quantity adjustment . . . and greater efficiency, at any rating. It is a complete, self-contained, portable steam generator with oil burning, high pressure boiler. It is engineered for extra heating capacity, long life, low maintenance. Simplicity of design and high operating efficiency make it the preferred Tank Car Heater. (Asphalt Heating Equipment).

Consider these advantages—Full pressure in 20 minutes from a cold start, gives top operating efficiency where quick steam generation is required—only 50 gallons of water per heated car is required, because

the Bros Heater uses the condensate returned from the tank car . . . Non-clogging, air atomizing oil burners with constant flame control permit quick adjustment for amount of steam needed to balance any load.

There is no carbon to remove from flues . . . costly pump replacements are eliminated because fuel oil is delivered to burner under low pressure . . . immune to hard water damage . . . low refractory maintenance cost . . . condensate return pump is steam operated, thus eliminating high speed mechanism. The Bros Tank Car Heater is engineered to do a better job at a lower dollar cost.

It is easy to tow at high speeds because of its compact design, low center of gravity, light weight and streamline design.

Write for Test Data—A complete report of tests made on a *non-insulated* Bros tank car heating boiler will be sent on request. They record a boiler and furnace efficiency of 71.8%.

ROAD MACHINERY DIVISION

WM. BROS BOILER & MFG. CO.

Minneapolis, Minnesota

BROS

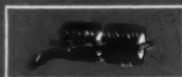
Tank Car HEATER

STEAM FLOWS
ALL TYPESBUILDERS AND
TRAILBUILDERS

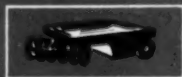
TANK CAR HEATERS

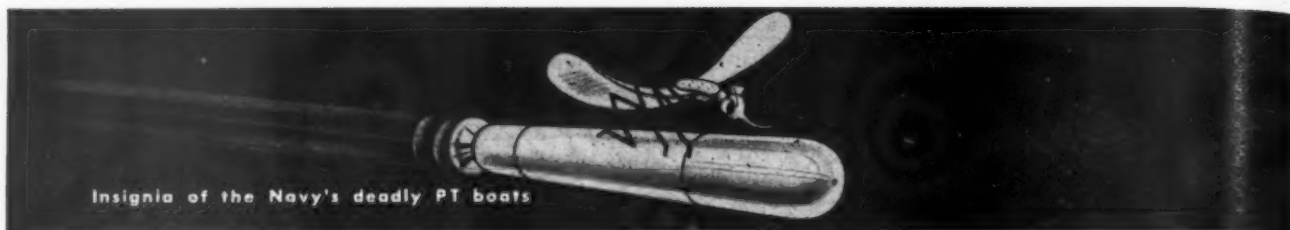


CIRCULATORS



TANKING ROLLERS

WHEELS-WHEEL
ROLLERS



What makes a mosquito buzz?

Muffled motors roar suddenly as the PT boat starts her sprint. Almost before tracers arch from the enemy cruiser, the Yankee Mosquito knifes in, lays her long, lethal egg and bounces away at a wide open 70 knots. Scratch another Nip cruiser.

Such hit and run fighting demands motors that don't miss. They must hum flawlessly to take a 77-foot cockleshell under enemy guns. And PT motors *don't*

miss—RPM DELO helps guarantee that.

Developed to solve the special problems of Diesel lubrication, RPM DELO ends the danger of stuck rings. It actually cleans motors gummed by other oils. RPM DELO's special additives guard bearings against corrosion, minimize sludge, cut wear to a fraction.

If you're interested in slicing repairs as much as 50%, in doubling the time between Diesel overhauls, remember

the lubricant that helps make the Navy's Mosquito boats buzz.

ORDER RPM DELO FOR YOUR DIESELS

RPM DELO is marketed under these names:



RPM DELO
Caltex RPM DELO
Kyso RPM DELO
Signal RPM DELO
Sohio RPM DELO
Imperial-RPM DELO
CONCENTRATE

Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity

STANDARD OIL COMPANY OF CALIFORNIA

ROADS AND STREETS, October, 1943

Care Every Day Keeps the Scrap Yard Away!

Hough Shovels are scarce—even in government departments. Therefore, every care should be taken to maintain your equipment for maximum service life.

Here are suggestions: Change your oil filters every 400 hours. . . . Keep wear strips and guide frames well greased. . . Use only clean SAE 10 oil (U. S. Engineers OE10). . . . Don't forget, a noisy pump means wear—it's caused by a choked intake line. . . . Keep cable tension equalized and be sure to replace cables as soon as strands become frayed. . . . Keep cutting edges sharp for faster digging. . . . Hardface for maximum service life. . . . Use bucket teeth for digging clay and shale; wide buckets for re-handling work. Hough equipment is made to last a long time with average care and attention.



HOUGH

"HUFF"

*Tractor Shovels
and
Road Sweepers*



Get More Out of Your Hough Shovels By Broader Application

Use them to load machinery parts on trucks—To set lighting standards and fire hydrants—To hoist machinery for wall and ceiling installation—To haul and dump mixed concrete into forms—For tree removal and loading—For

hoisting wagon scrapers and trucks—For pulling poles, posts and shoring. They're handy, readily maneuverable and have hundreds of time-saving applications. Tractor is of course available for other operation at all times.

• THE FRANK G. HOUGH CO. Libertyville, Illinois •

TOMORROW'S HIGHWAY and TOMORROW'S PAVER

War birds settling home with bomb bays empty; truck transport, rolling from city to city heavy laden with war goods; both roll over smooth concrete, probably MultiFoote laid because there are more MultiFoote pavers in service than any other make.

From India to Alaska, MultiFoote pavers are pouring out the concrete for war birds nests, highways for war transport, igloos for ordnance storage.

MultiFoote pavers are both wartime and peacetime tested for building the roads of tomorrow.

Check the pavers you see at work on the job, in pictures, anywhere at all! Notice that they are predominantly MultiFootes. Here is practical assurance that MultiFoote pavers will give you the kind of service you want after the "Duration." We will be glad to furnish any details you need for future planning.

Ewing Galloway Photo

THE FOOTE CO., INC.
NUNDA, NEW YORK

MULTIFOOTE

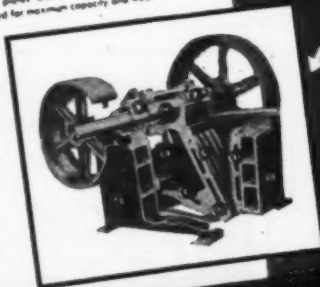
CONCRETE PAVERS



A NEW BOOK THAT SHOWS YOU THE *INSIDE STORY* —

Design principle *of the* PIONEER JAW CRUSHER

- 1 **OVERHEAD ECCENTRIC SHAFT**
The overhead eccentric gives a forward and downward crushing stroke.
- 2 **SKF BEARINGS**
SKF bearings are mounted close together and fully protected by labyrinth oil seals.
- 3 **TOGGLE PLATE**
The toggle plate holds the lower end of the Pitman at the proper setting, but will break first to protect the crusher from damage.
- 4 **WELDED STEEL BASE**
Double wall welded box construction provides strength and base.
- 5 **MOVING JAW PLATE**
Moving jaw plate has overhanging lip to protect lip of bottom of Pitman.
- 6 **ADJUSTING MECHANISM**
Wedge type adjustment gives easy, quick adjustment without shutdown.
- 7 **JAW PLATES**
Jaw plates are manganese steel—reversible and curved for maximum capacity and wear.



IT TELLS YOU

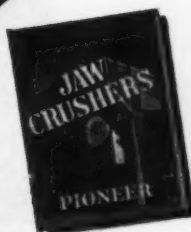
- How a Jaw Crusher Operates
- Why the Overhead Eccentric Crushes More Rock
- How the Screw and Wedge Adjustment Saves Time
- Why the Double Wall Welded Base is Stronger
- How SKF Bearings Take End Thrust as Well as Radial Load
- Why Self Aligning Bearings Are Essential
- How the Labyrinth Seals Protect the Bearings
- How New Jaw Design Protects the Pitman Lip

IT'S CRAMMED FULL

of pertinent data—photographs and drawings.

It will give you the inside information on Jaw Crushers—and it's told in a new and interesting manner.

Write today for your copy
—it's FREE! ◆



To PIONEER ENGINEERING WORKS
1540 Central Avenue
Minneapolis 13, Minnesota
Please send us a copy of "Pioneer Jaw Crushers".

To _____

Pioneer
ENGINEERING WORKS
MINNEAPOLIS 13, MINNESOTA, U. S. A.

Communications AS MODERN AS AT HOME

At war, code messages flash between advanced posts and control centers. For speed and accuracy, teletypes are used, their vital electric power supplied by gasoline engine-driven generators. Another of the hundreds of uses for the hundreds of thousands of dependable Briggs & Stratton 4-cycle, air-cooled gasoline engines now serving our armed forces.



Our experience gained in meeting new production highs—and, at the same time, constantly maintaining Briggs & Stratton standards for precision, quality, durability and economy—will be equally important and advantageous when we again resume peacetime production.

Our customers, and the owners and users of Briggs & Stratton gasoline engines, will find an even "improved" service and a "better" product, to maintain our recognized position as builders of "the world's finest air-cooled gasoline engines."

Can we help you now, on present war-time needs, or post-war planning?

"It's powered right —
when it's powered by
Briggs & Stratton."

BRIGGS & STRATTON CORP.
MILWAUKEE 1, WIS., U. S. A.

ENLIST YOUR DOLLARS
BUY WAR BONDS

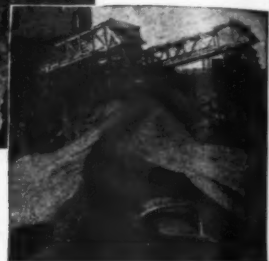


SAUERMAN Power Scrapers



Dig and haul
all kinds of
material for a
few cents per
yard.

Operated
by one
man.



EVERY SAVING in man-hours on construction work is a direct contribution to the war effort. Sauerman Power Drag Scrapers are chosen for excavating and stockpiling on defense projects because this simple, sturdy equipment has a 35-year record as a saver of labor and time in moving all kinds of earth materials. Write for Catalog.



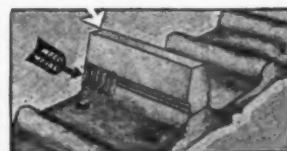
SAUERMAN BROS., INC.

588 S. Clinton St.

Chicago 7, Illinois

Rebuild your
TRACTOR GROUSERS
WITH **BULLDOG**
Grip-Lugs

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SEND FOR BULLETIN R-2

Increases Traction Efficiency.
A Quick and Economical
Repair.

**ALLIED STEEL PRODUCTS,
INC.**

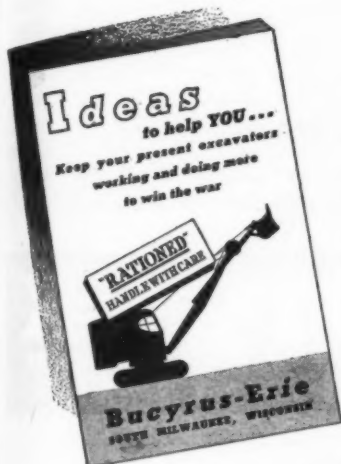
NBC Bldg.

Cleveland 14, Ohio



Check list FOR BIG OUTPUT AND LOW MAINTENANCE

Efficient job planning and preventive maintenance essential to continuous peak excavator performance demand constant vigilance. Check your operations against this list to make sure nothing important is being neglected:



This 32 page, 5 1/4 x 8 1/2" booklet, attractively illustrated and printed in two colors, is packed with practical, experience-tested suggestions on how to maintain maximum excavator production. Ask your Bucyrus-Erie excavator distributor for copies for your organization, or write us direct if you prefer.

1. Give your operator a chance to be a good one. Plan your job setup to move materials with the fewest motions in the shortest distance.
2. Analyze your cycle time, study delays and the percentage of your job efficiency at regular intervals.
3. Weigh monthly production records rather than daily. Steady output chalks up records that count.
4. Keep your excavator clean and inspect thoroughly at regular intervals. Stop troubles before they start, make repairs promptly.
5. Watch adjustments daily. Keep them right, always. This speeds output, saves repairs.
6. Keep lubricants *clean*. Dirt and grit build up into a grinding compound, sabotaging machinery.
7. Follow lubricating instructions religiously. Correct lubrication is best prescription for long life and trouble-free operation.
8. Drain engine crankcase while hot, flush out periodically. Keep fuel clean. Use clean soft water in radiator, flush regularly, don't put cold water in a hot engine.
9. Observe safety rules. Accidents are losses to everyone concerned. Safety first pays dividends.

Each one of these points is discussed in detail — there are over 100 specific suggestions — in a free booklet we hope will be helpful to your organization. It applies to all makes of excavators.

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.

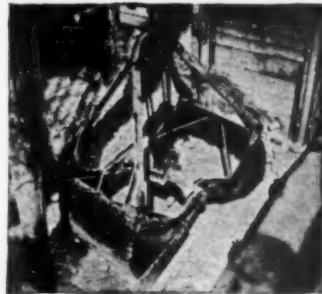


an OWEN FEATURE

Properly proportioned, correctly placed weight in an Owen Bucket gives the operator complete control under all conditions whether digging on a low angle or below his line of vision in a pit or swiftly moving river.

The OWEN BUCKET Co.

Breakwater Avenue, Cleveland, Ohio
Branches: New York Philadelphia Chicago Berkeley, Cal.



OWEN BUCKETS

A MOUTHFUL AT EVERY BITE

CONNECTING RODS

are
L-O-N-G-E-R
in
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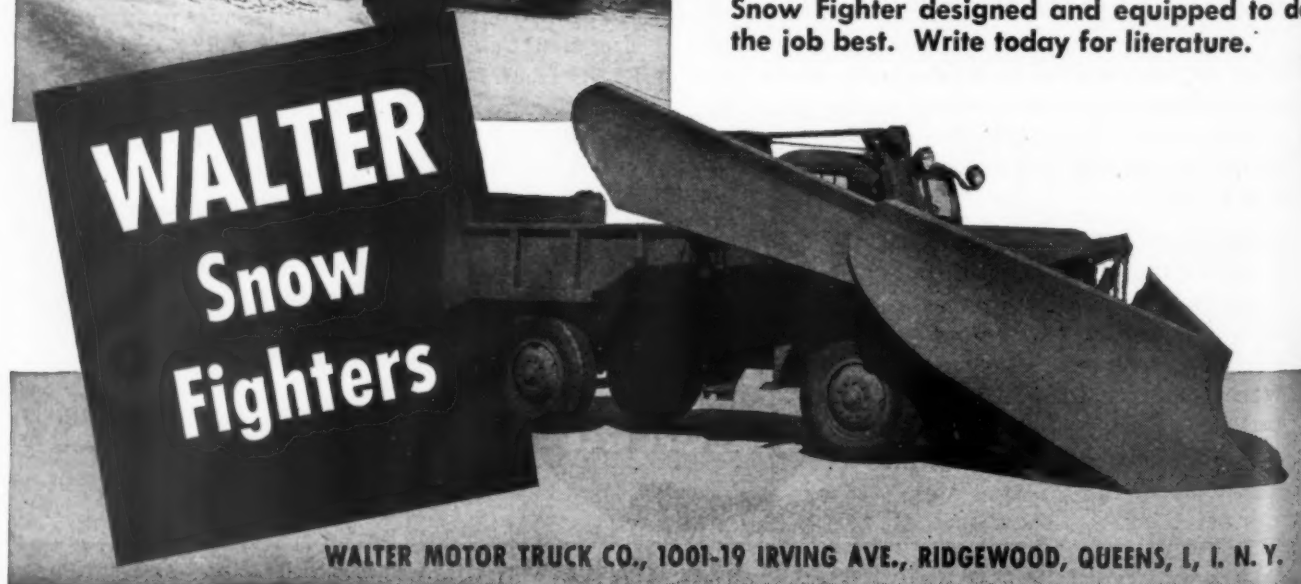
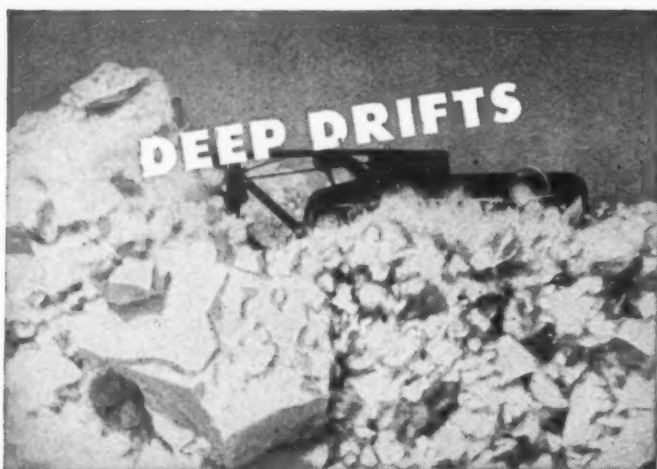
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REDUCES WEAR BY REDUCING FRICTION

ROADS AND STREETS, October, 1943



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Walter Snow Fighters keep going when other equipment slips or stalls, because three patented Automatic Locking Differentials proportion the power to the FOUR driving wheels according to the traction of each wheel at any instant.

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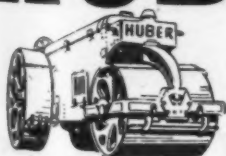


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When our bombers take to the air, they have but one mission . . . to lick the enemy. When the ground crew prepares for the take-off or the home-coming, they, too, have but one mission . . . to keep the landing fields in working order. Helping the ground crews to do their jobs well are HUBER Speed Scoops, Rollers and Bulldozers, working in all parts of the world with the same dependability for which they are known at home. THE HUBER MFG. COMPANY, Marion, Ohio, U. S. A.

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Today, because we, like you, are devoting all of our efforts to the Nation's drive for victory, Monotubes are produced only for the construction of war plants and other essential war projects.

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Remember these special Monotube features if you're building for war production *today*, or planning peacetime projects for *tomorrow*:

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THE UNION METAL MANUFACTURING COMPANY • Canton, Ohio

ROADS AND STREETS, October, 1943



BOMBS AWAY!

Begin with

Cedarapids

Built by
IOWA

Igloos no eskimo will ever live in stretch away over a desert wasteland in the Far West. These innocent buildings house an awful punch for here is one of the first resting places for Axis cities. the 1000 lb. bombs destined for Axis cities. Building this great Ordnance depot was a rush job to keep up with the production of war materials. The job called for 30 igloos a day and a peak production of 4450 cu. yds. of material.

To perform a feat like this meant that aggregate production at the crushing plants, the cement delivery, batching, hauling and mixing had to synchronize perfectly and the key plant, which were two Cedarapids Crushing Plants, had to tick hour after hour day and night without a hitch. This is just another of the many "highball jobs" on which Cedarapids equipment has proved its ability to deliver. These are the jobs that we want you to remember when you are faced with post war aggregate producing problems. Cedarapids plants can be engineered for any final size of construction aggregate materials and Iowa can meet your future plans whether it be for crushers, screens, bins, asphalt plants, driers or portable or stationary plant equipment. Now is the time to become acquainted with Cedarapids.

Come to Headquarters for Aggregate producing equipment.

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**INTERMOUNTAIN
CONTRACTORS
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CONSTRUCTION CO.
build 30 IGLOOS
A DAY with
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CRUSHING PLANTS!**

ANNOUNCING "DURAPLASTIC"*

The original Vinsol-resin air-entraining portland cement that makes concrete pavements scale-resistant

The fact that air-entraining portland cement makes concrete pavements highly resistant to freezing and thawing and to scaling due to salt action was discovered in the Universal Atlas research laboratories in 1937-1938, and subsequently proved on this test road built at its plant at Hudson, New York, in October, 1938. Since then more than a score of pavements with this type of cement have been installed in 15 or more states.



THIS was first proved on a test road at the Universal Atlas plant at Hudson, N. Y., built in 1938 by an experienced contractor under standard New York State highway specifications. On this road the concrete made with Atlas *Duraplastic* air-entraining portland cement remained 97% scale-free after 60 cycles of freezing and thawing and heavy applications of calcium chloride... equivalent to many years of actual service.

Duraplastic is the original Vinsol-resin air-entraining portland cement. Its commercial announcement follows five years of research by Universal Atlas in the laboratory, in the plant, and on actual jobs. It is a true portland cement in which a small but very precise quantity of the air-entraining material is interground during manufacture, in accordance with current Federal and ASTM emergency specifications.

Our Technical Service Bureau will provide detailed information about *Duraplastic*, the cement that makes pavements scale-resistant. Write today. Ask for a copy of "Pavement Scaling Successfully Checked." Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

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RS-D-1

QUICK FACTS about Atlas Duraplastic Cement


1. Complies with current Federal and ASTM emergency specifications.
2. Renders concrete pavements highly resistant to scaling due to the action of salts used for ice removal.
3. Protects concrete against the effects of freezing and thawing weather.
4. Minimizes segregation and bleeding. Concrete is more uniform throughout and more durable.
5. Permits earlier finishing.
6. Requires no additional materials at the mixer.
7. Called **DURAPLASTIC** because it makes concrete more durable and more plastic.



For Scale-Resistant Paving
ATLAS DURAPLASTIC
Air-Entraining Portland Cement

ROADS AND STREETS

October, 1943, Vol. 86, No. 10



Typical scene this past summer along the Alaska Military Highway, where thousands of dump trucks, dozers, graders and scoops mingled with a procession of military supply trucks. Roadway at right is being raised two feet with ledge rock. Photo in August northwest of Whitehorse, Y. T.

2nd Year on the Big Road

Roads and Streets

By HAROLD J. McKEEVER
Editor, Roads and Streets

ALCAN HIGHWAY, glamour girl of 1942, settled down this year into a grim cinderella job of repair, improvement and partial reconstruction. Even its colorful name was changed; officially now it's not Alcan but the Alaska Highway. True to promise it carried war freight to Alaska and wayside points last winter, and true to expectations scores of its bridges and miles of its roadbed

washed out with the spring thaw. What has happened "up there" since early last winter—how spring damage was repaired, new bridges built and the roadway brought to higher standard throughout the past season—is the subject of this report, presented on the following pages and in subsequent issues of **ROADS AND STREETS**.

In its second year the Alaska High-

way continued to rank as one of the great road projects of history, and one of the largest construction jobs of the war. It has required the energies of over 17,000 men (and women), 81 contractors, 7,000 rolling machines. Supplying the project necessitated millions of miles of truck, rail, ship and plane haul from factories and supply sources throughout the U. S. and Canada.

ROADS AND STREETS, October, 1943

Still Strictly a War Project

And, lest we forget, it is still a war project, post-war tourist dreams to the contrary. Conceived shortly after Pearl Harbor as a supply line to the Alaskan theater and to north-country airports, its function continues to be strictly a military one. The tonnage moved last winter, while somewhat restricted by the coldest weather in a generation, met army expectations. The road's existence was a comforting fact at a time when

Kiska and Attu were still Japanese held. It continues to be of vital importance in war plans.

During the course of the present year's work the design standards for the road were cut several times to conform with swift changes in military strategy. The design criterion was reduced also to meet fund limitations and as an expedient to assure completion of reconstruction throughout the 1,410 main-line miles by the second winter.

Events Since Last December

By early December last year winter had settled down on the "Big Road," bringing—50° cold and with it icing and other formidable difficulties. The Army was busy rushing warm winter huts at wayside camps and preparing for winter trucking. A large part of the contractors' workers went south, leaving skeleton forces.

During December the Public Roads Administration proceeded with plans for permanent bridges, and fabrication was pushed in American and Canadian plants along with deliveries of bridge materials and equipment. PRA location parties completed surveys for a permanent highway route, embodying changes in the road as built (but did not work out design details until later in the winter).

During December the outlook was bad for winter hauling, subsequently to be maintained with interruptions under hazardous and trying conditions. Trucks broke down faster than they could be fixed until the army's repair program was fully organized and new parts obtained. Necessary shelter took time to build. Bridges began to freeze in and several were broken up by ice. Supply lines from the states, always a bottleneck, were a constant worry. The White Pass and Yukon Railway from Skagway to Whitehorse at mid-point on the highway broke down several times.

The Army, which had undertaken maintenance of the road, was assisted for a time by civilian forces on the Teslin-Whitehorse stretch and elsewhere. Around Christmas the Public Roads Administration (through its contractors) was given responsibility for maintenance of the entire road, which by then had to be handled as well as possible by facilities already at hand.

During January the contractors in the southern sector kept going on preliminary bridge work, camp buildings and preparation for 1943 road construction. Seven sawmills in the

sector produced lumber, and important headway was made on foundations for steel bridges at the Peace, Sikanni Chief, Muskwa and lower Liard river bridges. Contractors began building machine shops for overhauling broken down equipment units (of which there were many hundreds). In the Whitehorse area Dowell Construction Co. kept sixty men busy overhauling army construction equipment.

76° Below!

In this month civilian road maintenance became fairly well organized, new workers were recruited, and the army aided at iced-over spots.

During January the temperature went to 70° to 76° "below" in Yukon and Alaska; at Fairbanks the thermometer stayed below 25° continuously for six weeks. Virtually all outside work was halted. Military approval was given then for plans for proceeding with 1943 road construction on a basis of a 24-ft. graded width and a 36-ft. shoulder or grade width, dust palliative where warranted, 3 per cent minimum grade on "prairie" and 7 per cent in heavy construction. This criterion also called for sufficient base and surface

thickness to support a 10,000 lb. maximum wheel load in all weather, a minimum of 12 inches of selected base material being contemplated.

In February the cold abated at times and maintenance crews were able to raise grades with stockpiled gravel, do rock work and otherwise improve certain sections. Some culverts were installed, guard rail placed, muskeg backfilled, and clearing completed for projected relocations.

Bridge effort was held up by the non-arrival of steel. Warm "chinook" winds brought rutting, necessitating more graveling. Finally in late February bridge steel and timbers began to arrive.

March brought more cold, with 64° at Edmonton.

U. S. Engineers Direct 1943 Job

March also brought to a focus serious policy questions as to what construction should be attempted in 1943 as the best support of the war effort. Over 3,300 additional equipment units were needed to push the improvements planned.

March found Public Roads engineers pushing bridge designing, with personnel thus engaged at Denver, San Francisco, Phoenix, Ogden, Vancouver, Edmonton, Fort St. John and Whitehorse.

Whereas pioneering of the highway last year was largely a Corps of Engineers effort under the Northwest Service Command, with PRA providing some 7,000 civilian workers through private contractors, the 1943 program has been under U. S. Engineer District direction, the U.S.E.D. being activated in December, 1942. It was determined at that time that the Public Roads Administration would handle road construction under general U. S. Engineer supervision, but it was April before a division of functions became clearly established.

FAIRBANKS TO PANAMA!



Editor "Mac" McKeever and Indian packer brewing noontime tea in the Yukon

ROADS AND STREETS readers will be able to do a lot of chairside traveling as a result of articles from afar presented by Editor "Mac" McKeever and Field Editor John Black. McKeever's reports, beginning with this notable story, will cover the tremendous second year's effort on the Alaska Military Highway, and other American projects in the North. Black's articles, starting with his impressions of Mexico's roads (Sept. issue), will cover highway developments South of the Border, with main attention to the Pan American Highway.—E. S. Gillette, Publisher.



Roads and Streets

Truck drivers rolling through to Fairbanks this coming winter will find a vastly improved Alaska Military Highway, heavily graveled 26 ft. wide most of the way and with fewer "truck trap" hills and turns. Reason: 17,000 men, 7,000 machines, working all season. Cost of project; approximately \$115,000,000 to date

The U.S.E.D.'s function as then defined was the determination of line and grade. Military traffic operation of the road continued under the Northwest Service Command.

1943 Standards of Construction

By the end of last year several stretches of the highway totaling perhaps 100 miles had been completed or nearly completed to a relatively high standard (30 to 36 ft. grade width). By April this year much preliminary work had been accomplished toward bringing additional sections up to a similar degree of improvement (as defined in January). But as summer advanced the standards governing new construction, relocation and improvement were cut down several times for reasons already noted, causing considerable confusion. To aid in unifying the efforts of all concerned, a principal engineer of the Public Roads Administration was stationed in the U. S. Engineer Division office at Edmonton to direct construction under PRA supervision in conformance with military policy.

The projected permanent line cut out many kinks and humps in last year's hastily located road, but was seldom more than a mile or two from the old line; and in many places the two coincide, particularly in the St. John-Nelson, Teslin-Whitehorse and Tanacross-Big Delta sections.

In March, 1943, a decision was made to modify the 36-ft. grade criterion heretofore noted, but basically to adhere to the often-meandering 1942 location "where expedient." This criterion was soon further tightened up, however, and much of the summer's work was done under a policy of definitely following the centerline of the tote road (existing lower-standard

road) except where military authority authorized a relocation, the criterion being 26-ft. shoulder width, 10 per cent maximum grades and no formal limit on curvature or sight distance. The base course was cut from 12-inch to 9-inch standard, and surface course from 6-inch to 3-inch. Under this decision, realignment occurred only where necessary to get 10 per cent max. grade or where it was cheaper to relocate than to bring the existing road up to the 26-ft., 10 per cent standard.

In late months the road's design was whittled still again, permitting reduction of shoulder width to 24 ft. and omission of surface course. Several miles eastward from the Alaskan border were built to the "best possible" width and depth of gravel in the weeks that remained before frost, with a very minimum of grade reduction and only minor relocation to get around the worst swampy spots.

Thus, still as at the close of 1943, the Alaska Highway isn't improved to any one standard, but varies from

section to section. But it is a vastly improved highway as facts in the following pages will show.

Final Construction Plans

The Public Roads Administration has completed an accurate traverse and profile over a large part of the highway, along with taking of topographical and other data that will be of vital use in the further development of the highway and opening up the Northwest region. At the close of the construction work a transit traverse will be run over portions of the random army location incorporated in the present line, and final construction plans prepared, using a scale of 1 inch to 400 ft. for maps and horizontal profiles and 1 inch to 40 ft. for vertical profiles. These plans will be needed to make an accurate final accounting of funds. Such data, projected through 1,400 miles of previously unsurveyed and but vaguely mapped country, may some day conceivably become as valuable as the highway itself.



The Army expected many temporary culverts to wash out last spring. They weren't disappointed! (Photo from Geo. M. Shepard of Oles Construction Co.)



Roads and Streets

Greasing time on advance work in Western Yukon, Utah Construction Co.
Note greasing equipment mounted on skids for towing through the soup



Photo Courtesy Public Roads Admin.
Thawing out a culvert with steam, necessary of
many of the small temporary culverts last winter.
Probably this will always be a spring problem



Steam-thawing holes for piling, Koidern
River in Yukon. Temporary bridge here
required three successive new decks as
it settled during summer



Roads and Streets

Dynamite tent on the Utah work, where con-
siderable blasting was necessary to get
stone for ballast in absence of gravel



200-watt lamps were strung along for
night grading where this contractor
was short of flood-light equipment

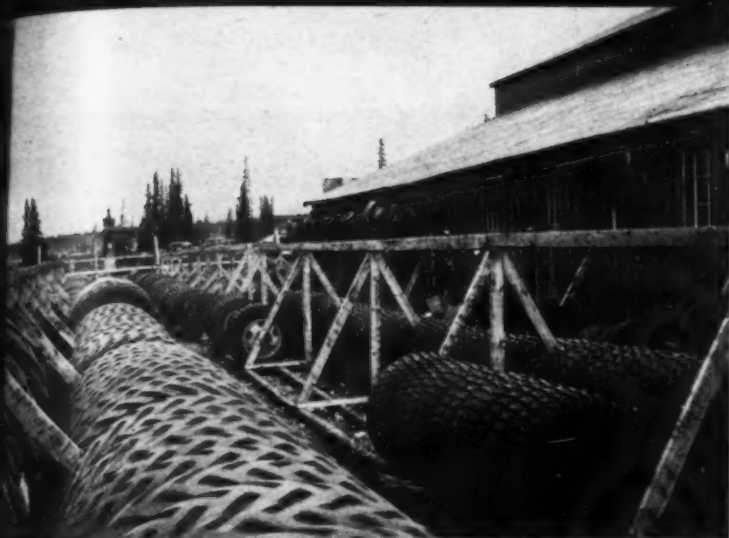
The 2,000-ft. Peace River suspension bridge as it looked last
April (completed in August). Aggregate heating plant and
bin, lower left. Towers being erected from construction tower
skidded on ice



Drilling frozen ground for channel change excavation. From
6 to 8 holes were drilled and loaded with 2 or 3 sticks 40%
gelatin powder, fired with battery plunger. August 25, 1943
Photos Courtesy Public Roads Admin.



Roads Admin.
n, necessary
ports last winter
spring problem



Roads and Streets

Tires by the trainload went into the year's work. A cache of big fellows at the Elliott Camp

Dragline and hauling scrapers in a heavy cut. Over 20,000,000 cu. yd. of excavation on Alcan in '43



Photo Courtesy Public Roads Admin.

Not a creek, or a highway, but the famous "Grand Canyon", worn through melting ground by tractors along the roadside (see article)

ung along for
is contractor
t equipment

ation. From
sticks 40%
st 25, 1943



Roads and Streets

220,000 cu. yd. of rock per mile came out of this shelf, mile 104 west of Fort Nelson on Emil Anderson's section



Contractor camps this year ranged from modern towns with insulated buildings, shower houses and other comforts, to less elegant advance camps such as this one near the Alaskan border

Thirty miles of the highway over impassable melting frost near the Alaskan border still looked like this. Photo by ROADS AND STREETS' Editor, Harold McKeever, on horse party in advance of reconstruction forces. Rider is Supervising Engineer H. E. Tolen. Utah Camp 5 men met Lundeen's outfit near here recently to reestablish a continuous road into Alaska





Photo by Bert Thornberg of Govan & Adler
Dynamiting ice around trucks frozen in while crossing an Alaskan river

Battling Ice, Snow, Thaw, Flood

Ice, rather than snow, was the big problem on the Alaska Highway. And the spring "messed things up" on schedule

WINTER maintenance on the Alaska Highway included "glacier" control, snow removal, sanding and maintenance of bridges.

Glaciering or icing-over of the road at cross-drainage points was a matter of grave concern in December west of Whitehorse. This phenomenon had begun to occur in November on the northern sector. By mid-winter ice had fanned out over the road in upward of a hundred places, fifty-six "glaciers" being charted in a survey.* Iced areas ranged from a few feet to a thousand feet or more, at one point along Kluane Lake in Yukon blanketing the highway six to ten feet deep. At another point, on the Haines-Champagne spur road, a hillside was turned into a giant ski slide of ice for three thousand feet. At other locations shelf roads became sheathed with a thin ice fan which, though only a few feet across, made truck operation perilous.

Troops were put to work at iced spots. Blasting was tried; also use of chlorides and other chemicals, salamanders, steam thawing, trenching ruts with picks, bridging over. But since the condition is due to continued seepage of springs or water under surface moss, the chief means of relief finally proved to be drainage. Cross ruts or grooves were dug where water seeped across the road. Culverts were installed to drain the seep-

age through, or if already in service were kept open at times with steam heaters.

The Dowell organization, deployed west of Whitehorse, had particular difficulty keeping its stretch of road open. Three steam boilers were used to thaw drainage grooves across the road. Conventional salamanders, supplemented by heaters improvised from gasoline drums, were kept burning weeks at a time at the lower ends of culverts to keep water flowing. Heaters were also lined up along open channels. A 3-mile detour was necessary to get around ice by Kluane Lake.

*Report, "Glaciers" on the Alcan Highway, Whitehorse to Big Delta, compiled by Benjamin F. Hake, Major AUS, staff geologist, Northwest Service Command. This report described 56 "glaciers" occurring on the 566-mile section observed, 35 being concentrated in the high-elevation, wet-climate area between the Alshik and White rivers in Yukon. These include several glaciering river crossings.

Because of the importance of this phenomenon to present and future highway development in Canada and Alaska, the cause is worthy of note. It is the result of overflow and progressive freezing of running or seeping water, generally from a gully, creek or adjoining muskeg flat, river or spring. The U. S. Geological Survey has proposed the term "icing." "Glaciers" consist of sheets, terraces, domes or cones of ice, often having water running over, through or under them even during coldest weather. No doubt hydrostatic pressure due to progressive freezing of frost-trapped bodies of ground water is an active factor.

Interruption of the insulating blanket of vegetation on fluffy snow sometimes causes icing to develop, but most of it occurring along the Alaska Highway would have occurred anyway. The only practical answer usually is to relocate on

At another point on the Dowell section, the road gave no trouble all winter, only to ice up suddenly in the spring during overflow of an adjacent flooded flat, necessitating a detour.

Snow Removal Not Difficult

Snow plowing wasn't the laborious task anticipated. The snow blanket was less than 3 feet thick along much of the highway, and only 1½ to 2 feet in some areas. Snow clearance was handled by patrol sections. The routine, differing little from northern U. S. practice, consisted chiefly of constant patrolling with graders or

better ground.

Major Hake listed six special conditions contributing to roadway glaciering:

1. Water issuing from hillside springs, where it had accumulated during the warm season.
2. Occasional hot springs, which will cause ice deposits during winter drainage.
3. Accumulated winter run-off, which is forced to stay in the zone of frost action because many valleys are partially flooded by deposits of low permeability.
4. Fluffy snow blankets over moss cover, beneath which water may run over the ground for long distances or a long time before it freezes.
5. Streams fed by true mountain glaciers have extremely variable flows, hence their courses are a network of shallow braided channels. Mountain streams entering broad valleys form channel-braided alluvial fans. Both types of streams are highly susceptible to restriction by frost and consequent "glaciering." (Most larger streams northwest of Whitehorse this type.)
6. In these latitudes frost penetrates several feet into the ground; frost areas consist of rock, soil, ice under the snow. Removal of the snow and moss blanket aids frost penetration and sometimes initiates glaciering.

trucks with under-body plows. North of Whitehorse V-plows and several rotaries were pressed into service. One storm deposited 3 to 6 feet of snow, requiring three days to clear. Two-lane clearance was the rule.

Sanding was a constant operation along hundreds of miles and at hills. Stockpiled gravel or sand was trucked out and spread usually by hand. Maintenance crews stood ready at all times to help army trucks out of ditches or over hills. At other places ice was not a problem since winter graveling was in progress.

Thaw Arrived on Schedule

"Thaw" is an ominous word up here. Temporary bridges and often skimpy gravel were placed hurriedly last year with the full realization that the spring of 1943 would cause widespread destruction. Actually, the damage was less than many authorities anticipated, or worse—depending on what section you have in mind.

To highlight the picture, the Fort St. John-Fort Nelson and other more heavily ballasted stretches not on frozen ground, stood the thaw fairly well. Temporary closure was due more to bridge washouts by spring floods than to wholesale "bottom dropping out" of the roadbed.

Hit St. John Area April 7

On April 7 and 8 the thaw descended on the southern part of the highway, softening the grade and washing out numerous bridges, necessitating closure between Fort St. John and Fort Nelson until April 13. The roadbed came through fairly well, however, since graveling had continued all winter. The road on north-west to Whitehorse was closed entirely for a day on April 10. Thereafter some trucks went through and

spring maintenance was possible through to Whitehorse until heavy rains again closed a large part of the 950 miles to Whitehorse for a week late in May. The Muskwa bridge near Fort Nelson was closed for a week in April, and briefly again three other times.

The most serious tie-up of the season occurred in midsummer when army supply and construction traffic was in full swing. July 10-19 the road below Nelson was closed due to washout of six bridges following heavy rains.

The Alaskan end required similar periods of closure. The last 130 miles into Big Delta, where the road joins the Richardson Highway into Fairbanks, was closed for 9 days beginning in late April.

One Section Closed All Summer

East of the Alaskan border the road also was closed. The road here for 150 miles (last link pioneered in '42) was little more than a lightly graveled winter trail, completed last November over frozen surface crust. Therefore it was the hardest hit this spring and summer. Many miles were impassable all season except on a good swamp horse. Nearly all the road lies over permanently frozen drainage-locked ground, whose surface progressively melted, shrank and settled wherever the moss and vegetation had been bulldozed away, leaving the Alaskan Highway intermittently by a lake and a ribbon of ooze. In rebuilding this section it was often easier and cheaper to begin over on a new line adjacent to the old.

A fact which can be disclosed, now that military traffic is again rolling through to Fairbanks, is that due to the devastating damage and lack of men and equipment for reconstruc-

tion, this 150-mile section remained closed to through traffic all summer. Truck drivers tried to get through as late in the spring as possible; quarries were opened up, some gravel being spread to get equipment through. In June a Studebaker 2½ ton "6 by 6" was pulled through by a heavy tractor from the White River seventy miles to the boundary. Several foot and horse parties made it during the summer. But no vehicular traffic until autumn.

At times all along the Alcan, of course, trucking was limited by soft going even though the road was not officially closed. But a steady volume of military cargo did roll up the line to the Whitehorse area and wayside destinations all through the season, a fact of inestimable value in pushing other military projects in the north.

Maintenance of bridges during winter and spring called for constant vigilance. All winter guards were posted at larger structures to watch for the first signs of bents shoving out of line from ice pressure or scour, or to help traffic across where the decks were badly iced over. As spring approached lumber was piled on the banks, in readiness for emergency repairs, and pile drivers were spotted at several threatened bridges. Then when the thaw hit, numerous bridges went out in spite of every effort, others were not endangered, and still others were saved by quick work.

Maintenance This Winter

Plans are for about 1008 miles of the road to be maintained this coming winter by contractors on a fixed fee basis. The 617 miles for Dawson Creek to Watson Lake will be maintained by hired labor.



Placing an oil pot to keep water running through roadway ice



Dozing snow from ditches to keep it from melting on the roadway. April 8, 1943



Like the proverbial lazy mule, tractors often needed bonfires built under them to get them going. Dangerous but effective

Columbia Newsphoto



Photo Courtesy Public Roads Admin. Steam thawing a frozen truck. Photo courtesy Bert Thorburg of Govan and Adler

A winter convoy crossing the 2-mile-wide Donjek River flat

Winter Scenes along the Alaska Military Highway



George B. Critser

Photo Courtesy Public Roads Admin.



Columbia Newsphoto

Showing how streams farther north build up with ice. More than one temporary bridge was completely sheathed over with ice to a depth of several feet last winter

April maintenance along the southern part of the highway. The spring thaw arrived the day this picture was taken, shutting down the road completely for a week or more



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The 1943 Alcan Construction Job

Over \$27,000,000 worth of equipment was employed on reconstruction, widening, topping out, relocation; considerable rock work this year

“WHAT'S going on up there? I thought the road was completed all the way to Alaska last year!”

Many Americans harbored such questions. The answer is, there wasn't time in the first year to build the road good enough everywhere to survive the elements—a fact which in no way dims the Corps of Engineers astonishing pioneering achievement.

The second year's task, in a nutshell, was to restore the road after the thaw, construct 55 permanent bridges and replace numerous temporary ones, clear and build minor relocations, add 4000 to 6000 cu. yd. of ballast and 500 to 1500 cu. yd. of surface gravel per mile virtually throughout the 1360 miles from Fort St. John to Big Delta, cutting down innumerable hills and widening a thousand miles of grade in the process.

Even after scaling down design standards, the task remained one of great magnitude. Estimates dated August 18 indicated that the 1943 work will include 5663 acres of clearing and grubbing, 20,887,000 cu. yd. excavation, 5,844,000 cu. yd. select borrow, 1,754,000 cu. yd. surfacing and 375,800 lin. ft. culvert pipe. Over \$27,000,000 worth of equipment (new value) was required. It is estimated that the direct 2-year construction cost of the “Big Road” will not exceed \$115,000,000.

Construction Methods and Equipment

To describe just what happened, mile by mile, would take many pages. The following, however, should convey the picture and further emphasize the immensity and difficulties of the job. These notes cover only the roadway; bridges will be discussed in a separate article.

Clearing—Clearing wasn't the continuous hurculean task of last year. The 1943 job was 10 per cent clearing, 30 per cent grading and temporary structures and 60 per cent ballasting and graveling. Clearing and grubbing were necessary only in connection with relocations, opening up “select borrow” or gravel pits and widening the clearings. Most of the time some kind of a road was already there.



Widening and straightening involved considerable rock work, sidestepped last year for lack of time and equipment. Drilling equipment, jackhammers, compressors and other requirements were anticipated in planning 1943 work

Dump Trucks a Familiar Sight

Grading—On some of the contracts there was heavy rock excavation, avoided in last year's haste. On others, cutting down hills in earth was the main task. A large part of the grading work, however, consisted of cutting new wide ditch lines and establishing a more definite roadway cross-section. The 1942 grade generally had to be widened 4 to 8 feet, with material usually moved from the berm or from adjacent borrow pits or hilltop cuts.

Typical procedure was that used by the Haas, Royce, Johnson outfit near Watson Lake. This gang first went through with clearing cuts, the dozer pushing the old fringe of fallen trees and trash back several feet to at least 20 ft. from the ditch on either side. Using pull blades next it cut rough ditch lines, none being built here last year. Then came two big roughing tractors with heavy scrapers, and finally two 8-yd. finish scrapers and two patrol graders, leaving the grade ready for ballasting. From 9000 to 11,000 cu. yd. of excavation per mile was required. This section was graded 30 ft. wide for 26-ft. surface-width of gravel, following the old centerline very closely. Ballasting with 6000 cu. yd. per mile of sandy materials, followed by 1500 cu. yd. of crushed gravel of $\frac{3}{4}$ " max., was in progress in August.

Building Up—The big chore was to

find, uncover and spread suitable borrow material and gravel, and all up and down the line throughout the summer traffic was impeded by the continual job of material placement. Borrow pit practice involved nothing new. Material for short haul was taken out with scrapers. In other pits dozers loaded trucks from ramps, often portable skid-mounted affairs. In big pits, and sometimes small, shovels proved fast and economical. Some pits grew to huge dimensions. About two thousand dump trucks put in most of the summer tail-gating material, sometimes widening well-built-up sections with no difficulties, at other times floundering with the help of winches and dozer rescue squads.

There was a scarcity of skilled labor, and the best outfit in some cases was the one which had a few drivers who knew how to nurse 100% overloads through deep ruts without getting stuck. Dumps ranged from 2 to 8 yd. capacity, but the loads were far larger. The Alcan experience clearly emphasized the advantage of all-wheel or dual-rear-axle drive in rough or soft going.

Crushing plants handled over a million yards of material. Whereas, last year, crushing and screening equipment was brought in only on the southern end of the road, this year it was scattered along nearly all sections. Its most important function was to remove the abundant oversize

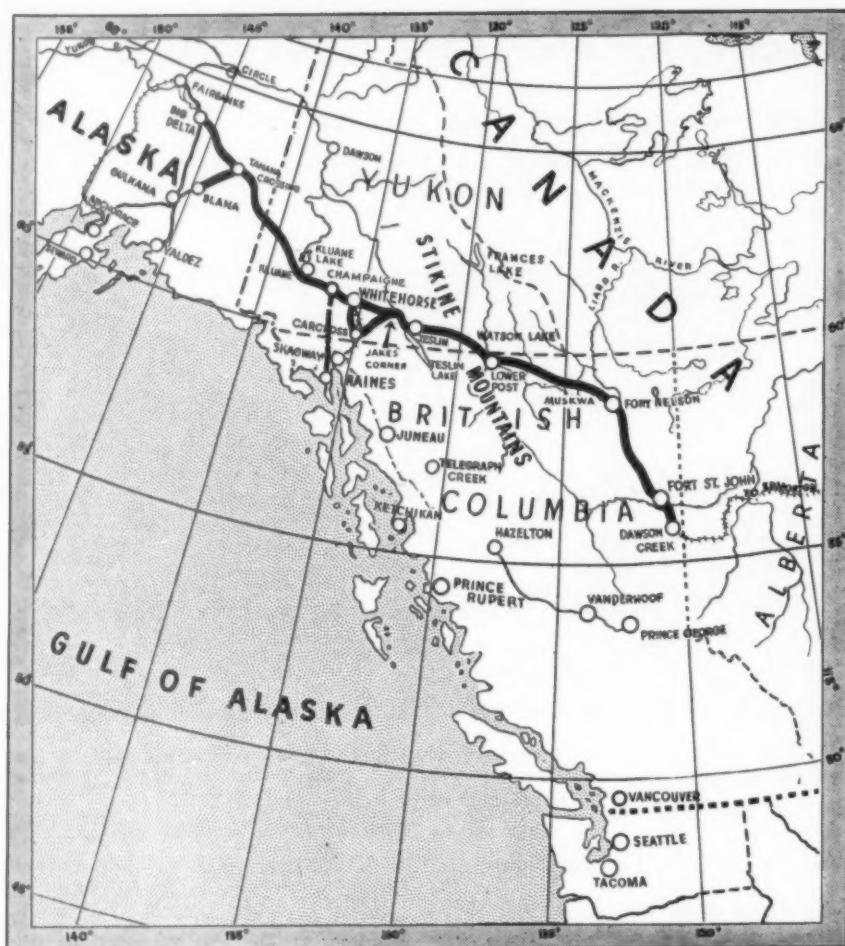


Fig. 1. The Alaska Military Highway today follows essentially the same route as last year, although given many minor relocations. It connects Dawson Creek, B. C., with Fairbanks, Alaska, last 90 miles being over the Richardson Highway. It passes through only two established towns enroute (Fort St. John and Whitehorse). The other points shown are trading posts, Indian settlements or stream crossings. Not shown are the several score work camps and Army relay stations. The road's length to Fairbanks is equivalent to the distance from Boston to Omaha

and reduce the excessive percentage of fines.

Light plants, too, had an important part, in spite of the long daylight hours, two 10 or 11-hour shifts being the rule. Nearly every tractor and shovel carried lights. High flood-light towers fashioned from poles and mounted on skids were a common sight. The Utah Construction Co. supplemented flood lighting with 200-watt lamps strung along the road on short poles, to help the night-shift boys see where they were dumping.

Dawson Creek to Muskwa

The 50-mile section from the Dawson Creek railhead to Fort St. John was completed in 1942 as a 36-ft. high-standard gravel road and required only normal maintenance this year. The Canadian contractors (R. Melville Smith group) who built the road moved north to a new location late last year.

The 256 miles from Fort St. John

to the Muskwa River near Fort Nelson remained under Okes Construction Company management. The Okes unit contractors, working in the Army's wake, last year had succeeded in getting a road that varied from a 36-ft. fully metalled roadway (26 miles of this) to 24-ft. mountain-type.

The 1943 Okes work consisted of clearing, grading and surfacing numerous minor relocation (made or started before reduction in standards were ordered), cutting down grades, and placing new ballast and surface on about 200 miles.

Contrary to common impression, this was perhaps the road's worst section from the standpoint of remaining steep grades. The chief job was to cut down hills and eliminate the numerous "truck traps" that had developed in winter hauling. Also a great volume of swamp material was draglined out of soft stretches and backfilled. This procedure was usually

found more expedient than attempts to relocate on better ground, for as a rule the Army troops had found the best general line through the muskeg.

The original Okes program called for 787 acres of clearing and grubbing, 3,100,000 cu. yd. excavation, 1,260,000 cu. yd. borrow, 400,000 cu. yd. surfacing, 11 miles of minor drainage structures—all later scaled down—and fourteen bridges. The contractors employed 1200 major equipment units.

Okes work was scheduled for completion September 15, and late in the season some of their equipment moved to sections west of Fort Nelson, in line with a policy of adjusting sections to the ability of the contractors to handle work.

Muskwa to Watson Lake

However the major part of the 1943 job west of Muskwa bridge to a point 70 miles from Watson Lake (260 miles) was performed by thirteen Canadian contractors covering 9 to 30 miles each. Original estimate: 4,250,000 cu. yd. excavation. Heaviest cuts of the year were in this area, which takes in summits of 3500 and 4200 ft. elev. Spectacular rock job was the carving of a shelf along a side canyon near McDonald Creek (mile 104-107 from Muskwa) where 220,000 cu. yd. per mile of removal was required for a relocation. Several 80-ton blasts were touched off, bringing down 100,000 cu. yd. material at a time.

The Canadians employed 800 trucks and 325 other rolling units, including 17 portable gravel plants. Numerous heavy shovels were required. Their section also took in 28 bridge jobs, including the 1000-ft. suspension bridge over the Liard.

Watson Lake-Whitehorse

The largest of the 1943 management contractors was Dowell Construction Company. Working north-westward its operations will be outlined in some detail as typifying the whole 1410-mile effort.

Dowell's work was greatly expanded over last year to encompass 480 miles of line, reaching from 70 mi. south of Watson Lake to a point near Kluane Lake in western Yukon. The magnitude of the Dowell work alone is better visualized in remembering that this is equivalent to the distance from Chicago nearly to Kansas City—and that more than 1500 rolling vehicles were on the job and more could have been used. Equipment included such wholesale figures as 260 tractors, 157 scrapers, 79 patrol graders, 17 concrete mixers

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Courtesy Public Roads Admin.

Cutting down a grade on the east slope of Coconino Canyon



Widening in progress on the Haas, Royce, Johnson section. Gravel was thrown down here early in the season. This road will be topped out and widened by season's end



Scores of crushing plants were scattered along the road. This set-up included a dozer trap. Binder trap and conveyor at left. Power unit right foreground



A few 'pulls were used on this contract

Two to four feet of "ledge run" stone was the answer to soft melting ground across this low spot on the Utah section

Roads and Streets



★ ★

Much of The 1943 Job Was Like This

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Constructing foundation course for surfacing near Tenmile Creek. (Photo July 26)

Photo Courtesy Public Roads Admin.



for bridges, 14 crushing plants, 53 air compressors, 60 shovels, 20 platform trailers, 40 welding outfits.

Dowell Work Varied Widely

Grading and placement of "select borrow" on the Dowell section was handled in 13 contracts of 20 to 53 miles each. Surfacing was divided into three long contracts of 96 miles, 246 and 138 miles respectively.

At Dowell's southern end, heavy grading was required in getting the road in and out of valleys and to the Upper Liard crossing. The road here adheres to 1942 army location. Then for the next 50 miles the road was generally good and required mainly widening and thickening of ballast.

Getting equipment into this area entailed long, tedious conveying. To reach Dowell's southernmost camp southeast of Watson Lake, Morse Bros. & Associates, the contractors here, had to walk their entire outfit 302 miles from Whitehorse—including 25 tractors and 10 scrapers. "We started the job in May with one resurrected army truck, four axes and a cross-cut saw," recounts Morse Bros. superintendent, H. C. Sandin. "We cut lumber with an army saw-mill, lived in tents while erecting our camp, and fished to eat, until our outfit arrived and we got organized." In early September Morse Bros. were hauling 20,000 cu. yd. of material and building a mile a day, aided by several tournapulls. (Night-shift man on the grade, just to feel better, carried a lantern and a club as protection against wolves.)

Near Teslin Lake on J. C. Dawson's stretch, a 10-mile relocation eliminated the steepest, windingest piece of road on the Dowell section, where many trucks had stalled and bad ice conditions were a plague. This took in considerable rock work; eliminated 1500 ft. of rise and fall.

In the Lake Teslin area 1943 work follows the army road. Widening and raising continued here, 5000 cu. yd. per mile ballast and 1300 cu. yd. surfacing being added to the 800 cu. yd. of stabilized surface placed last year.

From Jakes Corners 43 miles to a point near Whitehorse the job was one of straight widening and graveling to last year's road, which though narrow followed a modern location. A mile of troublesome frozen ground was corrected with draglines. After stripping silt covering, the frozen material was cut down a foot or two with scarifiers and scraped out, and 3 to 4 ft. of clean sand backfilled to provide an ice blanket that would also make a stable subgrade.

The last seven miles into White-

horse, built last year for intensive use, needed no further work.

West of Whitehorse

Proceeding west from Whitehorse, the first 20 miles was merely topped and widened; no relocation, though following an extremely crooked pioneer trail. Next comes the so-called Takhini cut-off, a 16-mile relocation, cleared, and 30% graded last year, which was completed along with a timber truss bridge. Then several miles of minor straightening and widening, and 16 miles of new construction.

Near Pine Creek a long line change was partly completed when a military ruling, which forbade further relocation not absolutely necessary, stopped the job at midpoint. A 3-mile cut-off line was built from the end of the relocated portion over onto the Haines branch road, traffic following this branch back to its junction with the Alaska road. Dowell's last 22 miles consisted of widening, ballasting, surfacing.

Frozen ground was often encountered west of Whitehorse—usually wherever a cut of more than five feet was made in glacial silt. Frozen ground varied greatly in moisture content. If saturated, it made trouble as it melted, leaving no stability under the equipment. If comparatively dry, it could be loosened with a roter and removed with scoops or dozers.

Elliott's 35-Mile Section

E. W. Elliott, a contracting firm operating independently, took the ball from a point just south of Klauene Lake (mile 105 west of Whitehorse) onward for 35 miles, almost entirely relocation. Surfacing was handled by one of the Dowell firm as an expedient.

Elliott's work follows the PRA standard line except for about eight miles skirting Klauene. Over 175,000 cu. yd. of rock per mile was excavated to eliminate steep winding grades over famous Soldier Summit. Ledge for a shore-line road was taken out in 20-ft. lifts with 20-40-50% gelatine, using two compressors and 16 air hammers. Removal was with $\frac{1}{2}$ -yd. shovel and trucks, stoner of all removable sizes being dumped to build a relocation on a 6-ft. fill across the adjoining Slims River flat.

Utah Company's 148 Miles

The Utah Construction Co. had the next 148 miles. Much ballasting was done with limestone ledge material involving shorter haul than available gravel. About half the Army's 1942 line was relocated, following relatively easy grades and crossing several alluvial fans.

Over a hundred miles involved permanently frozen ground. The road was completely ruined this summer by the thawing of exposed frost areas. No effort was made to remove unsuitable subsoil; reconstruction was a matter of extending a thick carpet of borrow to support trucks. Again, from the Donjek to Edith Creek, very little gravel was found, and embankments were built with end-hauled gravel supplemented by rock borrow from wayside ledges. Gravel pits were scarce to Edith Creek, then plentiful on to the Alaska border.

On the Utah job was the locally famous mile-long "Grand Canyon", a trench paralleling the remnants of last year's road, worn down through progressive melting of frozen black soil under the trucks and tractors. This dozer-wide trench was 8 or 10 feet deep, and drainage outlets were cut at intervals to keep it from filling up with water. Convoys of supply trucks, chained together 2 to 4 at a time, were taken through by tractors until the road was rebuilt.

Utah Construction divided its 146 miles into 5 sections, with an outfit for each. The five Utah camps were the last to get rolling, Camp 5 at the White River being set up late in August. This firm, famous as a highballer, wound up strong, although handicapped by lack of equipment and skilled men and by rains and floods. A flood in the White and Koidern rivers on August 7 inundated several miles of road, taking out a camp. Since a long stretch remained impassable nearly all summer, it was necessary to shuttle supplies, gasoline and men along the line with pontoon planes.

Up in Alaska, Lytle & Green Again

The Lytle & Green unit contractors, again held down the fort in Alaska, handling 208 miles of main line from the Border to Big Delta Junction and going east of the border to meet the Utah crowd near the point where the bulldozers had their famous 1942 meeting. This year it was a case of gravel trucks meeting to reestablish the unbroken continuity of the Alaska Highway—this time with at least semi-permanent construction.

There were fewer line changes in Alaska, since last year's road was built largely to the permanent survey. One major change was approved at

Fig. 2. How construction contractors were scattered along the highway from the Alaskan Border eastward. This diagram takes in about 650 miles of highway. Bridges are marked (1) for steel truss, (2) steel beam, (3) wood truss, (4) timber trestle construction. A is Angles Grand & Supply Co., B is Bates & Robers contract

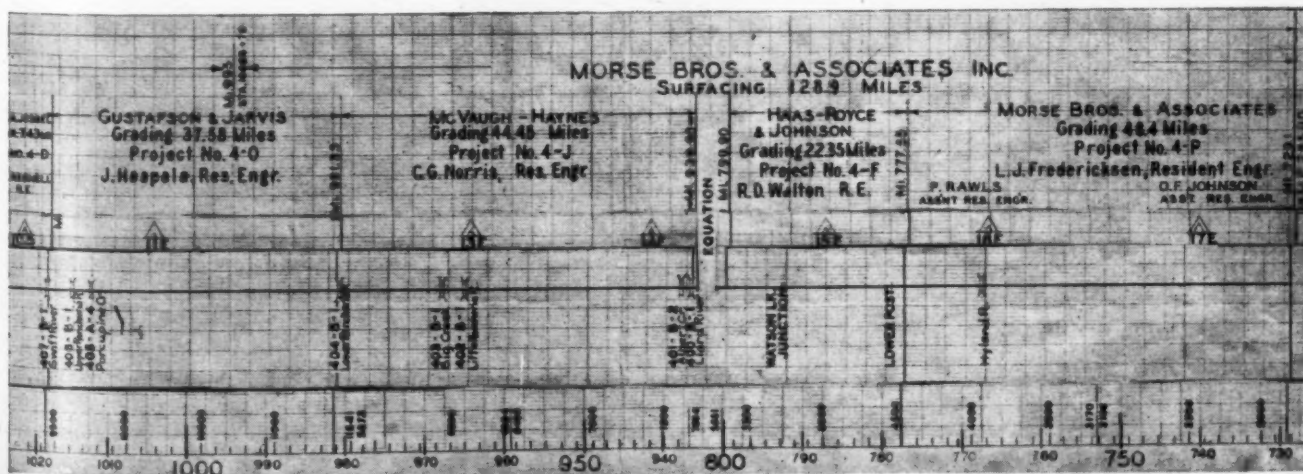
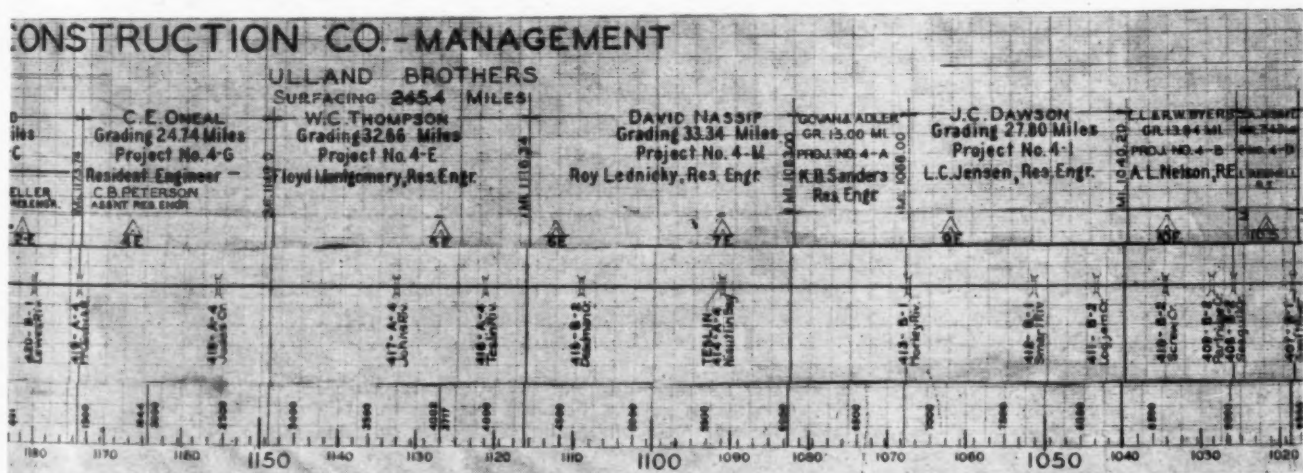
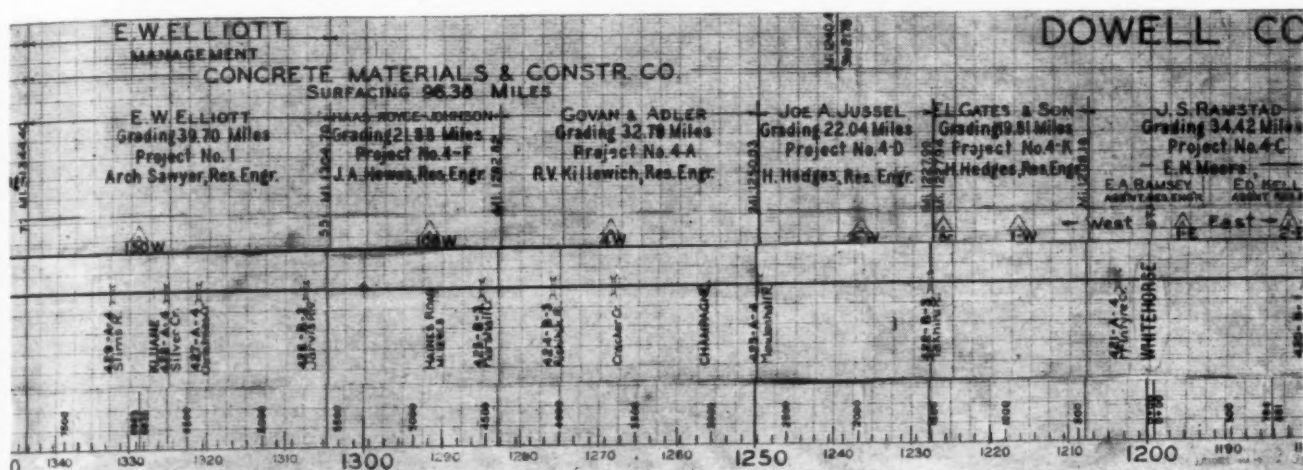
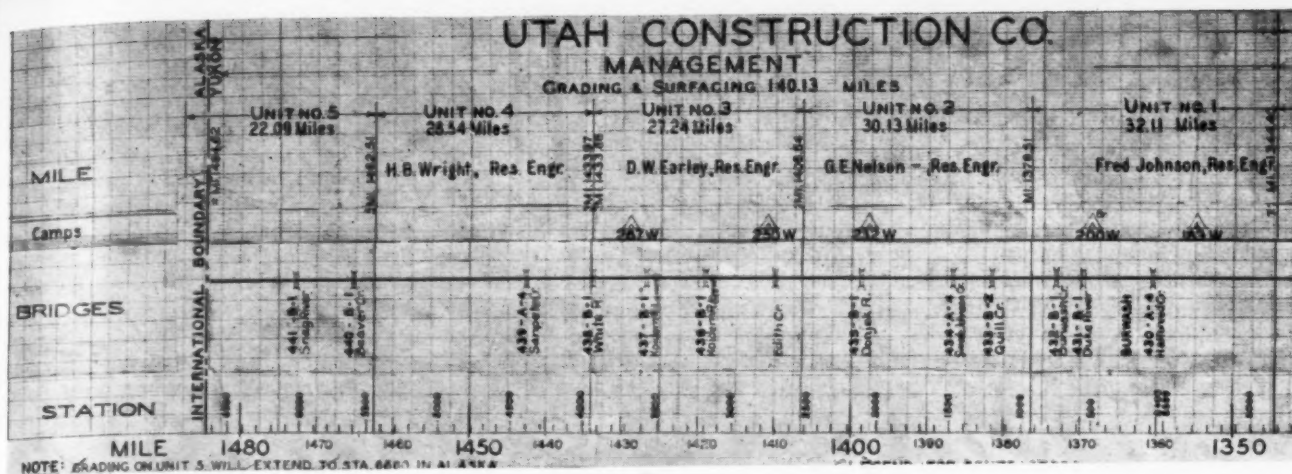
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the Tanana River near Tok Junction, where five miles was saved and big sand cuts avoided in approaching the new permanent bridge. Grades were not everywhere a big problem, since the highway skirts the Tanana River for many miles. Blow sand was a problem in spots. Good borrow pits were plentiful. By August much of the Alaskan portion had the appearance and riding qualities of a modern highway (the writer made a 60-mph, test trip in comfort in an army vehicle in the vicinity of Northway).

Of note is the fact that one of the Lytle & Green units, Lundeen, made about the only extensive 1943 use of corduroy. Wherever the going was soft in building new road or restoring road over wet or melting

ground, down went a mat of poles to get the trucks and tractors through.

The Haines Spur a Major Accomplishment

Completed also this season is the 145-mile spur road leading from the Alaska Military Highway (junction point 108 miles west of Whitehorse) to the port of Haines, Alaska, near Skagway. This highway is of the same general design as the Alaska Highway and involved many construction difficulties due to the mountainous terrain. It follows the remnant of the old Jack Dalton Trail for 42 miles out of Haines, crosses the Coastal Range, passes thence through a great glacial wash amidst magnificent scenery.

The road will supplement the White Pass & Yukon Railway, which it roughly parallels, and with the northern portion of the Alaska Highway will serve as part of a direct overland supply route to Fairbanks. It was begun late last year by the Corps of Engineers. Handled for a brief time by the Public Roads Administration, the road was completed for the Northwest Service Command under U. S. Engineer direction, Lt. Col. T. J. Hayes, district engineer at Skagway. The bulk of the construction was done by the contracting firms of Foley Bros. and Rohl-Connally Company. J. L. McLaughlin of Great Falls, Mont., and Truman Bowen, Fort Peck, Montana, furnished equipment for this job.

The Alaska Highway's Builders

Including a "who dunit" list of American and Canadian contractors

The Alaska Highway construction job this year was a civilian operation. Strung out on assigned sections or projects were sixty-three American and eighteen Canadian contracting firms, some operating independently but most being under the same four management contractors as last year. The contractors alone employed more than 14,000 workers at the peak, including 4,600 Canadians.

The function of the management contractors again was to plan and correlate the work of the construction contractors, transport equipment, hire men and get them to their jobs, build camps, keep food and supplies coming and otherwise set the stage for construction contractors to high-ball. Management firms supplied some of

the equipment. They also worked with Public Roads staff men to keep costs.

Hiring labor was a troublesome part of their job. Big "Help Wanted" ads in American newspapers brought in streams of men, a high percentage of whom couldn't stand the gaff. War-time restlessness also contributed to the high turnover.

Keeping Track of Equipment

Keeping tab on construction equipment and vigilantly planning its best use was a vital responsibility of the management companies. Machines were shuffled around among the unit contractors. Each firm kept a chart on which equipment was spotted at all times. Public Roads Administration sector offices also charted the

assignments of all equipment, listing it under 60 classifications. Dispatchers at headquarters or roadside stations checked every company machine entering, leaving or passing.

15 Contractors Under Okes

Again concentrating largely on the 256-mile stretch between Fort St. John and Fort Nelson (Muskwa), the Okes Construction Company outfits were little changed except for the addition of Mike Welch. The Okes firm comprises S. R. Okes, Day Okes and C. H. Palda of St. Paul, and the executive staff was again headed by W. E. Bates. The line-up is as follows:

Pederson Bros., Inc., Montevideo, Minn. (bridges); M. C. Astleford Co., Inc., Minneapolis, Minn.; Art Bolier, Robindale, Minn.; Sorensen & Volden, Balaton, Minn.; Adolphson, Huseeth, Layser & Welch, Minneapolis, Minn.; Thomas Bros., Foley, Minn.; Volck Construction Co., Rice Lake, Wis.; John Coghlan, Rollo, N. Dakota; Reese & Olson, Greenbush, Minn.; Brown & Leguil, Mankato, Minn.; Southern Minnesota Construction Co., Roverud Bros., Spring Grove, Minn.; Mike Welch, Annandale, Minn.; Dunnigan Construction Co., St. Paul, Minn. (bridges).

R. M. Smith Manages 15 Canadians

The following group of Ontario contractors operated again under R. Melville Smith Company management, Toronto, Ont., this year on the 260-mile section past Fort Nelson. R. A.



Rivkin—NWSC

The Haines Road in Alaska and Yukon, being inspected by Alaskan Congressional Delegate Anthony J. Dimond and Lt. Col. T. J. Hayes, U. S. Army District Engineer (Skagway)



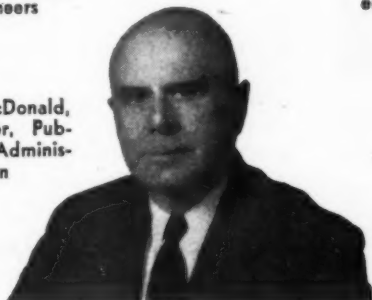
U. S. Army Signal Corps
Major General Eugene Reybold, Chief of Engineers



Pinkstaff PRA

At the Peace River bridge dedication in August—Brigadier General James A. O'Connor, Northwest Service Command; Senator James C. Scrugan (Nev.); Hon. Herbert Anscomb, British Columbia Minister of Public Works; Major General Phillip Fleming, Federal Works Administrator. Col. K. B. Bush, NWSC chief of staff, seen in rear

Thos. H. MacDonald, Commissioner, Public Roads Administration



W. E. Bates and C. H. Pelda, of Okes Construction Company

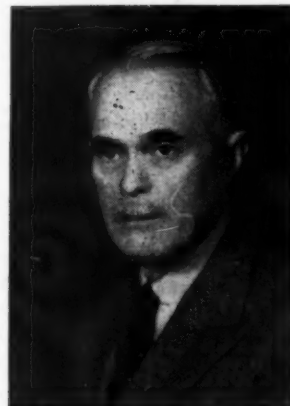


Brigadier General L. D. Worsham, U.S. Army Division Engineer, Edmonton



R. B. Johnson, general superintendent, and E. W. Elliott, of the construction firm bearing his name.

J. M. Franceschini, of Dufferin Paving Co., Toronto firm which built the Peace River bridge (right) with his gen. superintendent J. G. Pickard, daughter and family acquaintance



J. S. Bright, District Engineer, Public Roads Administration, Edmonton, who had charge for PRA



R. Melville Smith, of the Alaska Highway management firm bearing his name





One of the Pederson Brothers, of the contracting firm which built the Sikanni Chief bridge, with Sherman Powell, resident engineer for the Public Roads Administration

Campbell, general manager; T. F. Francis, superintendent:

Curran & Briggs, Ltd.; W. H. Harvey & Son; Storms Contracting Co., Ltd.; Don Construction Co., Ltd.; Wallace A. Mackey; Bond Construction Co., Ltd.; A. E. Jupp, Ltd.; Emil Anderson Construction Co.; Dufferin Paving Co. (including separate contracts for Peace River bridge substructure); Campbell Construction Co., Ltd.; Caswell Construction Co.; McNamara Construction Co. (including separate contract Liard River suspension bridge substructure); Highway Paving Co.; Rayner Construction Co. (misc. bridges); H. Harvey Building Contractor (camps).

Dowell, 17 Firms

Dowell Construction Company included Louis J. Dowell, project manager; Ross Woodward, ass't. project manager; Paul Turner, general manager at Whitehorse; Larry Wick, sup't. of equipment and transportation; Ralph Kennan and E. R. McGahn, sectional superintendents.

The Dowell contractors:

Hugh Goven & Adler Construction Co., Port Angeles, Wash.; Ray W. Byers, Los Gatos, Calif.; J. S. Ramstad, Seattle, Wash.; Joe A. Jussel, Seattle, Wash.; W. C. Thompson, Santa Cruz, Calif.; Haas, Royce & Johnson, San Francisco, Calif.; C. E. Oneal, Ellensburg, Wash.; Angeles Gravel & Supply Co., Port Angeles, Wash. (bridges); J. C. Dawson, Bellingham, Wash.; McVaugh-Haynes Co., Centerline, Mich.; E. L. Gates & Son, Project City, Calif.; David Nassif Co., Boston, Mass.; Gustafson & Jarvis, Sioux Falls, S. Dak.; Morse Bros. and Associates, Inc., Rochester, Minn.; Ulland Bros., Austin, Minn.; Concrete Materials Construction Co.,



Dowell Construction Company's Whitehorse superintendent, Paul Turner, and L. J. Dowell, project manager, dressed for the weather.



C. G. Polk of the Public Roads Administration in Alaska, with C. C. Coykendall, field engineer for Lytle & Green Construction Co.



F. M. Johnson, PRA project manager with superintendent Frank Laird of Utah Construction Co. Camp No. 1 in Yukon, setting Ye Editor McKee straight on some construction facts

Cedar Rapids, Iowa; Bates & Rogers, Chicago, Ill. (subcontractor on all bridges).

Lytle & Green in Alaska

This year the management firm of C. F. Lytle and Green Construction Co. of Des Moines, Iowa, on the Alaskan end, was represented by O. W. Crowley as project manager, D. W. Clayton, ass't project manager, and C. C. Coykendall, construction engineer, R. C. Cramer, business manager. Their group of construction firms was as follows:

Scothorn Construction Co., Cherokee, Iowa; William Horrabin Contracting Co., Iowa City, Ia.; Sears Construction Co., Clear Lake, Ia.; Gus Ostermann, Ocheyedan, Ia.; Ira Van Buskirk, Hawarden, Ia.; E. M. Duesenberg, Inc., Clear Lake, Ia.; Eblen & Eblen, Cumberland, Ia.; Eblen & Ekdahl, Cumberland, Ia.; Ferguson and Diehl, Jefferson, Iowa; Linnan Construction Co., Pocahontas, Iowa; Kaser Construction Co., Adel,



H. Mueller, chief engineer, and Ken Cummings, superintendent of Bates and Rogers, snapped at the beginning of big bridge job at the White River

Iowa; V. L. Lundeen, Inc., Montezuma, Ia.; J. Lee Hoak, Des Moines, Ia. (transportation); L. Peterson Cedar Rapids, Iowa (bridges); Welden Bros., Iowa Falls, Iowa; Western Engineering Co., Harlan, Iowa; Duvall and McKinney, Logan, Ia. (bridges); U. S. Steel Company, New York, (Tanana River bridge steel).

Lytle & Green's units built sixteen bridges, ranging up to \$854,000 in individual cost and totaling \$3,500,000.

Elliott and Utah Operate Independently

E. W. Elliott of Seattle, who last year functioned as a transportation contractor and road builder, this year concentrated on road work on a difficult 38-mile reconstruction in the Yukon. E. W. Elliott, owner, R. B. Johnson, general superintendent, James A. Davis, project manager, Bud Manson, superintendent.

Newcomer this year was the Utah Construction Co. of Salt Lake City, which reconstructed 148 miles in heavy going immediately adjoining Elliott and finally connecting up with Lundeen up near the Alaskan border. T. L. Terry was general manager.

Several Independent Bridge Contracts

Not identified directly with any of the above management or road building groups, but often working alongside them, were the following bridge or miscellaneous firms:

Crane Company, El Cerrito, Calif. (bridge dismantling); R. J. McClain-Bay Cities Engineering Co., San Francisco (bridge dismantling, also superstructure Muskwa River bridge); John A. Roebling's Sons Company, New Jersey, (superstructure of Peace River suspension bridge), Trenton; U. S. Steel Export Co., New York, N. Y. (Liard River suspension bridge superstructure); Haddock Construction Co., Pasadena, Calif. (bridges); John A. Roebling and U. S. Steel furnished steel for the Peace and Liard suspension bridges under separate contracts from that for the erection work.

U. S. Army Personnel

The Alaska Military Highway is one of the many military construction projects under the Chief of Engineers, Major General Eugene Reybold; and under the Northwest Service Command, Brigadier General James A. O'Connor, commanding with Colonel K. B. Bush, chief of staff. Col. J. P. Glandon, commanding officer of the Alaska Highway, directs military traffic, with Col. H. R. Solderston in charge of operations and Col. R. G. Caley, equipment maintenance.

Military responsibility for 1943 construction and road maintenance rested with the U. S. Engineers, Northwest Division, Edmonton. Brig. General L. D. Worsham is division engineer (succeeding Col. Theodore Wyman), with Col. E. E. Kirkpatrick, executive assistant in charge of engineering and operations and Col. C. M. Clifford, administration. Sector construction was under U. S. district engineers, Lt. Col. Lawrence E. Laurien (Dawson Creek), Col. James B. Johnson (Whitehorse) and Lt. Col. Gerald R. Tyler, succeeding Lt. Col. Moreland (Fairbanks).

Public Roads Administration

The Public Roads Administration under commissioner Thos. H. MacDonald and Federal Works Administrator, Major General Phillip B. Fleming, directed from Washington. J. S. Bright, Edmonton district engineer, continued in charge, with N. F. McCoy as associate district engineer and John C. Humbard, principal engineer and liaison man with U. S. Engineers. C. F. Capes and F. E. Andrews, construction engineers, were in charge respectively of the division offices at Fort St. John and Whitehorse. In the St. John division J. C. Williams and W. T. Pryor were administrative assistants; W. J. Nelson, Fred J. Dixon and T. M. Roach, supervising engineers, S. N. Bushnell, office. In the Whitehorse division H. A. Stoddart was assistant construction engineer on the Yukon work, and C. G. Polk on the Alaska end; J. B. Reyer, location Jean Ewen, design. Raymond Archibald, principal structural engineer, was in charge of bridge design for the entire highway, with a design office at Edmonton.

1944 A.R.B.A. Officer and Director Nominations

C. W. Brown, chief engineer, Missouri state highway department, and 1943 president of the American Road Builders Association, again heads the slate of official nominees for 1944. Other officer and director nominees, as submitted by the nominating committee are as follows:



Roads and Streets
Typical of the modern camps is that of Haas, Royce, Johnson in the Watson Lake area. Known for "swell eats"

For Vice-Presidents: Paul B. Reinhold, president, Reinhold & Co., Inc., Pittsburgh, Pa.; Charles W. Smith, president, Smith Engineering & Construction Co., Pensacola, Fla.; Lion Gardiner, vice-president, Jaeger Machine Co., Columbus, Ohio; Robert A. Allen, state highway engineer, Carson City, Nev.

For Treasurer: H. C. Whitehurst, director of highways, District of Columbia, Washington, D. C.

For Directors, term ending 1947: James C. Alban, president, Alban Tractor Co., Baltimore, Md.; C. H. Buckius, chief engineer, Pennsylvania Department of Highways, Harrisburg, Pa.; Samuel C. Hadden, chairman, Indiana State Highway Commission, Indianapolis, Ind.; M. J. Hoffman, state commissioner of highways, St. Paul, Minn.; Frederick Hoitt, secretary, New England Road Builders' Association, Boston, Mass.; E. L. Roettiger, state highway engineer, Madison, Wis.; Charles W. Upham, engineer-director, American Road Builders' Ass'n., Washington, D. C.

Principle of Highway Construction as Applied to Airports

To meet demand now and in the post-war "air era" for information on the construction of airport runways, the manual, "Principles of Highway Construction as Applied to Airports," has just been published by the Public Roads Administration of Federal Works Agency. It consists of more than 500 pages of text and specifications, illustrated with 60 line drawings and 33 halftones. Copies are available only by purchase from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. The price is \$1.00. There is no free supply.

"Since the construction of runways is largely a matter of highway engineering, the book might well be termed a manual of highway practice," according to a statement by the Roads Administration. "It will be equally useful in grading and surfac-

ing airport runways or highways."

The manual discusses grading, drainage, and design and construction of all the ordinary types of highway surfaces. All material is presented ready for practical application by the engineer in the field.

One feature that adds much to the value of the book is material on soil sampling, testing, identification and classification and on the practical application of such data in fill construction and in the construction of soil bases and surfaces. The publication makes available to field engineers for the first time, a complete manual on soil testing and application of test data. Methods of designing soil mixtures are illustrated by actual examples.

Univ. of Michigan Highway Conference Proceedings

Proceedings of the 29th Annual Highway Conference, held at the University of Michigan, Ann Arbor, Feb. 10 to 12, 1943, have been published by the University as official publication Vol. 44, No. 101. Available on request, this publication reproduces with numerous illustrations papers on railroad crossing protection, what authorities can do to conserve transportation, wartime traffic enforcement, the Davison highway, Willow Run access road, maintenance problems and other subjects. R. L. Morrison is Professor of Highway Engineering and Highway Transport.

Purdue Road School Proceedings Out

The Proceedings of the 29th Annual Road School, held by Purdue University, Lafayette, Indiana, Jan. 25-27, 1943, have been published by the Engineering Extension Department of the University. Compiled and edited by Ben H. Petty, Professor of Highway Engineering, the publication comprises 167 pages of valuable reference material, including papers on maintenance, equipment maintenance, tire conservation, pavement "pumping," airport drainage; other topics.

Editorial

ALASKA HIGHWAY, 1943

THE American public has the Alaska Highway pegged as one of the great construction feats of history. Certainly the pioneering of 1500 miles of northern forest road in a single year was an astonishing and unprecedented feat, and time will not dim the glory won by the Corps of Engineers troops.

It is difficult to assay this year's effort on the road. The 1943 job probably equaled or surpassed the previous year's in construction quantities, clearing excepted. Many individual citations are due for courage and resourcefulness, from engineering and managerial heads, who often labored the clock around, down to truck drivers and tractor mechanics to whom nothing was impossible.

Like other big war construction jobs this one was slowed down by high labor turnover, lack of skilled men, transportation bottlenecks, and to some extent by a shortage of equipment and parts.

The pioneering feat of a year ago was made possible by driving furiously toward a clear, imperative goal—some kind of a road all the way by winter! The feeling of urgency ran high.

This year the objective was less clearly defined among the civilian workers. Changes in design standards as work progressed (and differences in interpretation of "spec") caused some confusion and lost motion. Initiated for good military and economic reasons, these changes serve to focus attention on a fundamental difference between peacetime and military engineering: peacetime construction is best carried out to fixed plans, whereas Army engineers in wartime must keep their objectives utterly flexible. A military project may be tripled after starting, redesigned scaled down or abandoned as the swift tides of war dictate. Army men are trained to this vital viewpoint, as exemplified by the engineer officer who said to your Editor in effect, "The ideal Alaska Highway from our standpoint is one that will take the least effort to build, be just good enough to do until the war is over, and then fade back into the landscape."

Because of design compromises and wartime handicaps, some of Alcan's civilian engineers have felt that they weren't making a good showing. The fact is that despite all obstacles, this year another great job has been done up there and all concerned can rightfully feel proud. And a share of this pride belongs again to equipment manufacturers, whose machines, seven thousand strong, put on another dress rehearsal for the big things roadbuilders are waiting to do after the war.

CONGRATULATIONS!

TO Austin Road Company for their "E" award (p. 63). We can think of other contractors who should receive this honor.

To the Public Roads Administration for their new airport construction manual (p. 61). A good many highway engineers who haven't yet had airport experience will be getting it in the next few years.

To Secretary of Commerce's Special Aviation Assistant, William Burden, for recent urban conference paper on relation of airport development to planning of cities. A challenging subject.

To several more equipment manufacturers for the fine service manuals they've turned out for the Army. These are setting a new pattern for such literature.

To several other firms for a swell job on wartime booklets for themselves. For example, Bucyrus-Erie's new "Ideas" for keeping excavators going.

To Detroit and Los Angeles for their all-inclusive post-war highway programs. Looks like our two most-highly motorized population centers intend to have the wherewithall to stay that way.

To American Road Builders' Association for its program to sell the public on a post-war road program.

McKEEVER APPOINTED EDITOR

GILLETTE Publishing Company is pleased to announce the appointment of Harold J. McKeever as Editor of **ROADS AND STREETS**.

Since coming with us just a year ago as Associate Editor, "Mac" has made many friends among public officials, engineers and contractors and we know that our readers will welcome the news of his advancement. During past months McKeever has spanned the continent with notebook and camera, traveling over 25,000 miles to bring a succession of fresh and illuminating reports on wartime problems and methods. Latest of his reports is the article in this issue on the 1943 Alaska road job, which will be studied with special interest by those who recall his authoritative Alcan articles of last winter.



In his new post as Editor, Harold McKeever will continue to spend all possible time in the field, giving special attention to preventive roadway and equipment maintenance, access road and airport construction methods and post-war developments.

Mr. McKeever is a graduate civil engineer and Associate Member, American Society of Civil Engineers. He graduated from Kansas University and performed graduate work at the University of Illinois. His engineering experience includes work with a highway and bridge contractor and maintenance-of-way and bridge design with several railroads. A seasoned journalist and technical writer, McKeever was for a number of years identified with the preparation of technical literature and advertising in the construction industry.

E. S. Gillette, Publisher

Airport Contractor Gets "E" for Fast Job

Austin Road Company of Dallas and subcontractors finished \$2,000,000 contract month ahead of schedule

THE Austin Road Company of Dallas, Texas, was recently presented with an Army-Navy "E" pennant for high achievement in war construction. The occasion was the completion, thirty days ahead of time, of the airdrome at the Galveston Army air field. At an informal ceremony a letter from Under Secretary Robert P. Patterson was presented to Tyree L. Bell, vice president and general manager of the contracting firm, by Colonel W. G. Saville, U. S. Army district engineer at Galveston.

In behalf of the many employees who participated in the job and had gone to other work, the ceremony was attended by members of the contracting firm and of the subcontractor organizations. In stressing the unusual difficulties as well as speed of the job, Col. Saville stated that the Austin Road Company had shown that it can be relied upon at all times to perform large, urgent, unusual and difficult construction projects in a minimum of time and in a thoroughly satisfactory manner.

Beginning in March the contractor whipped this job along at such a pace that by late summer over half a million cubic yards of earth had been moved and a million square yards of concrete pavement completed. One and one-half million cubic yards of fill was pumped into the field area using U. S. Engineer Dept. hydraulic dredges. And the work was handled

to permit use of the existing field during construction of improvements. Five concrete pavers were employed.

In addition to the pennant, "E" pins were awarded to representatives of the subcontractors, including A. P. Little, of Harrison Engineering and Construction Co., Kansas City, Mo.; J. C. Williams, of Williams and Whittle and Williams and Broughton, Inc., Dallas, Texas; Joe Davidson, of Armstrong and Davidson, Athens, Texas; Roy White, of Roy White

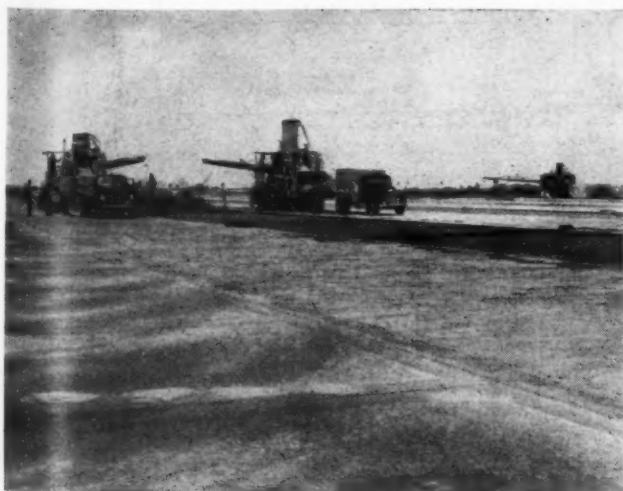
Electric Co., Houston; W. T. Livingston, of W. A. Kelso Building Material Co., Galveston.

Pins also went to subcontractor superintendents, representing employees and to M. R. Howard, U. S. area engineer, and to Capt. William Masculine, who had charge of dredge operations.

Charles R. Moore is president of the Austin Road Co., R. W. Dial project manager, John Reinhart, grading superintendent, Henry Carter, trucking, C. D. Jackson, office.



Photos by U. S. Army Engineers



Three pavers at work on the parking apron at Galveston Airfield



Well point equipment was used in laying drainage pipe



Placing gravel base on west-bound service road. Profile of service road is independent of that of the main roadway, is separated by earth slope in middle distance

Colorado Limited Access Road

Three contractors "ganged up" on \$1,500,000 project which includes barrier curbs and service roads at independent grades

DENVER has joined the ranks of American cities served by entrance highways of freeway or limited-access design. Scheduled for completion this Autumn, a five-mile expressway giving local citizens another foretaste of the roads of the future will extend out 6th Avenue to the Denver Ordnance Plant located three miles beyond the city limits.

Built at a cost of about \$1,276,000

By FRED MILLER

Resident Engineer,
Colorado State Highway Department, Denver

for construction and \$220,000 for right of way, the highway consists of two 32-ft. main roadways, separated by a median strip and flanked by separation curbs and two-lane local service roads. Each main roadway is designed for two 12-ft. traffic lanes

and an 8-ft. outer parking or emergency lane. The service roads are 22 ft. wide.

To Serve 10,000 Plant Workers

The 6th Avenue project follows State Route 182 and will permanently benefit the Denver region by stimulating suburban development and by relieving summertime congestion westward toward the mountain re-

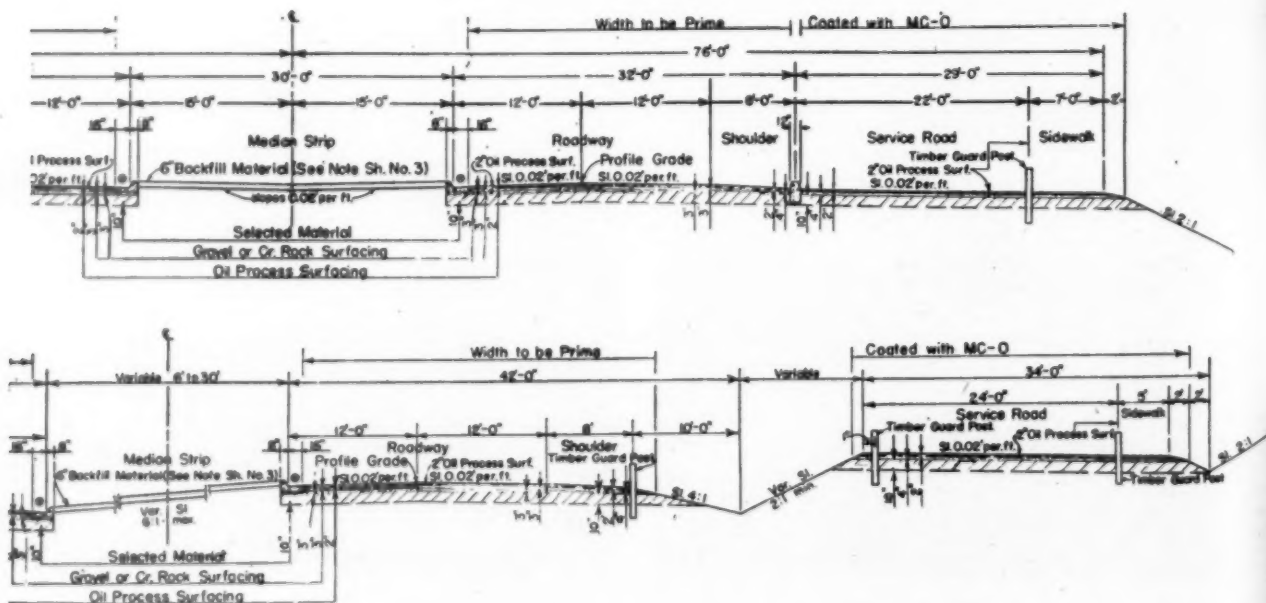


Fig. 1. Typical rural cross sections of Denver Ordnance Plant access road



Scrapers as well as graders helped out on fine grading of compacted subsoil. Note forms at left for barrier curb



Forms for barrier curb, as used by Lowdermilk Bros., were anchored in position between two lines of iron stakes (pieces of concrete bar) by means of braces and wedges as shown.



State resident engineer Fred Miller and resident engineers A. J. Davidson and Ed Dauchey



One sand-filled pneumatic roller aided gravel compaction. Arrow shows east-bound service road which skirts the top of the slope as a convenience to the farm house

sorts. But its primary reason for construction is the immediate one of adding sorely needed access capacity to the ordnance plant, where serious jams began to occur daily at shift time long before the plant reached full operation.

The cross-section adopted for this forward looking project called for a new conception of right-of-way width. A minimum of 150 ft. was necessary, the minimum being employed along the 1½ miles with the city limits. The first problem was to acquire the necessary land to widen the 80-ft. existing urban right of way. (City's share of cost and other pertinent details.) Width of land increases to 245 ft. at an arterial intersection at the city line, and is 220 ft. or more along the rural portion of the project, boundaries varying in width to provide for embankment slopes to service roads at independent grade elevations from the main roadways.

Oiled Gravel Construction

Oil processed gravel mat and compacted base designed to heavy-duty standards successful in Colorado, were employed. Main roadways consist of 2 in. of oiled gravel, supported on 6 in. of rolled gravel base (2 lifts) and 10 in. of selected sub-base ma-

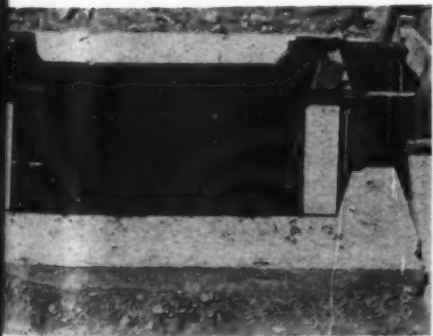
terial. Service roadways are identical except that only 4 in. of base and 10 in. of sub-base are used.

A total of 240,000 cu. yd. of grading was required, involving one of the poorest soils encountered in the state. Poor compacting qualities, along with the late, wet spring and time required to acquire and clear the right of way, delayed the contractors until June, although contracts were let late last year. The sub-soil, however, was satisfactorily compacted by the hauling scrapers without the necessity of formal density tests.

Topsoil from grading was stockpiled and later spread on the median strip, and on the backslopes as well as shoulder slopes of side ditches. The latter detail is a recent innovation in this state. Black earth was spread about 1 to 2 inches thick over the backslopes by means of a bulldozer as shown in the accompanying photograph. A cover crop to prevent washing will be sown in the Autumn.

Hillside Seepage a Problem

Within the city the roadway surface is designed to drain into man-holes leading to the existing storm system. Inlets at the median areas as well as at outer edges of main roadways, lead to a sewer line passing

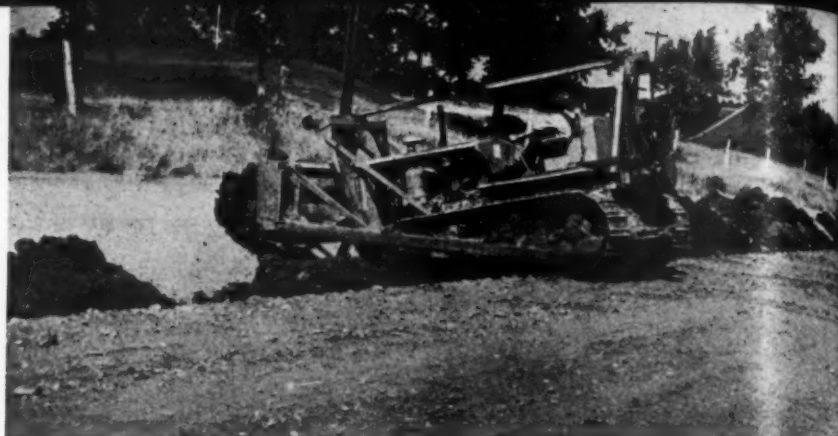


Creosoted wood inlet grating, set in a concrete frame, located in a gap in the barrier curb

Forms in place for the combination side-walk-curb-gutter



Barrier curbs were supplied by a low-slump, ready-mixed concrete designed for high strength. Concrete was vibrated



Top soil was spread over the back slopes as well as shoulders, being first dozed into place from a windrow on the shoulder and then bladed to uniform thickness



Screened base material was stockpiled for quick shovel loading



This crew placed concrete, stripped and finished several hundred feet of barrier curb per day

along beneath the median strip.

The rural roadway drains to open side ditches and outlets, or to inlets along the inner curb lines leading to cross drains. A bad hillside seepage condition was encountered for about a mile, necessitating a line of tile along the centerline, fed by laterals at frequent intervals.

A wartime feature is the use of creosoted wood inlet and manhole gratings. Side entrance box-culverts and a second line of culverts required to carry irrigation laterals were also of treated timber. Several irrigation siphons of reinforced concrete or concrete pipe construction and one special concrete culvert of triple 10-ft. box design were required.

Sub-base and Base Materials On Down-hill Haul

Material for the 10-in. sub-base was supplied from a pit of excellent gravel uncovered in the foothills at the outer end of the project. Gravel was mined with shovels, carried to a 3-in. screen with quarry dump trucks, and moved down grade to the job with trucks. Although two-lift placement was originally planned, sub-base material compacted so readily that it was found satisfactory to roll the 10 in. in one lift. Sheepsfoot rollers were used, supplemented by a pneumatic

tired roller that happened to be available.

Acceptance of the sub-base and base courses were determined by visual inspection, with 90 per cent densities in mind.

The 6-in. base was placed, sprinkled and rolled in two lifts. It consisted of screened gravel selected to meet specifications of not over 50 per cent wear when tested in accordance with the Standard Los Angeles Abrasion Test (AASHTO T-96-42). The bottom 4-in lift was graded to 1 in. maximum; the top 2 in., to $\frac{3}{4}$ in. max.

Of special interest is the Colorado practice used here of specifying the quantity of lift material per 100 sq. ft. of surface, or per station of roadway. Payment on tonnage placed has proved more satisfactory for both the state and the contractor than the old practice of paying on a square yard basis from thickness checks. Tonnage specifications expedite the job by helping the contractor plan his stockpiling more accurately. Estimate quantities are shown on the plan sheets.

It cuts spreading time and cost.

Processing

After tack-coating the first lift of base gravel, material for the topping was windrowed and processed with MC-2 or MC-3, as available, rolled,

and the usual seal and chips applied. The main point of concern, other than to utilize only strong, abrasion-resistant aggregates, was to get a dense thoroughly compacted mat. Coupled with the high bearing value of the 14 inches of processed base and sub-base material, such an oil mat in our experience is capable of carrying a high intensity of traffic.

TYPICAL SECTION OF CONCRETE COMBINATION CURB, GUTTER & SIDEWALK

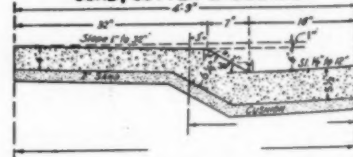


Fig. 2. Combined walk-curb-gutter

Quantities (Estimated) for 5 Mile Project

Unclassified excavation	213,600 cu. yd.
Selected material (10" sub-base)	157,750 tons
Screened gravel surfacing	109,000 tons
Wetting fills (water)	4,000 M. gals.
24-in. concrete culvert pipe	5,663 lin. ft.
6 and 8-in. v.t. drain tile	4,370 lin. ft.
24-in. concrete syphon pipe	600 lin. ft.
Concrete sewer pipe	5,200 lin. ft.
MC-4 asphalt	75,500 gals.
MC-0 asphalt	91,200 gals.
MC-3 asphalt	458,200 gals.
Road-mix processing	\$10,000 sq. yd.

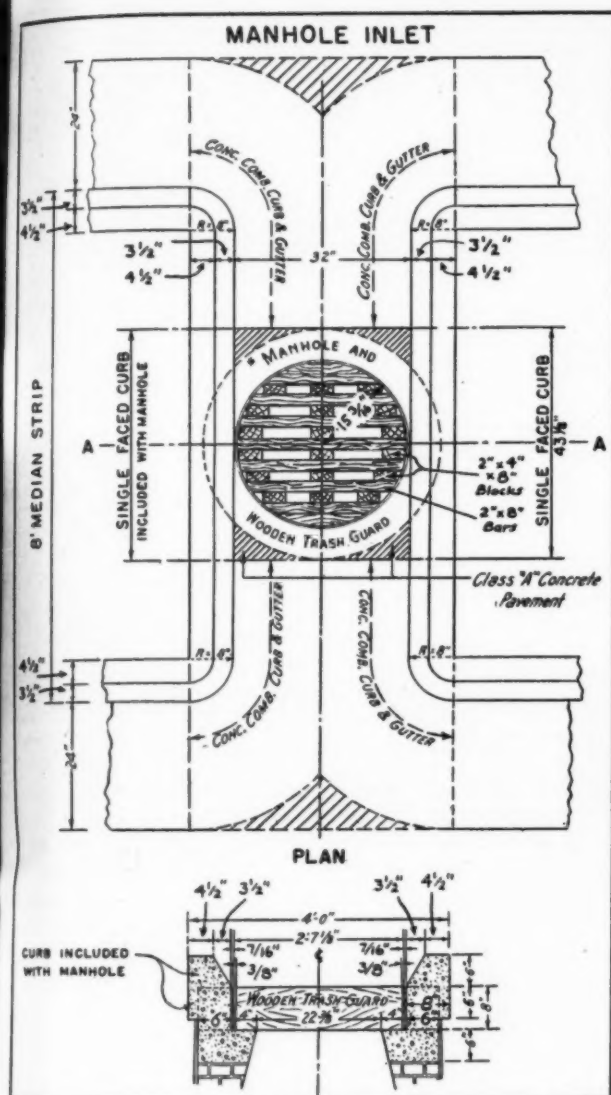


Fig. 4. Details of manhole inlet in median strip, including creosoted wood covers

Integral Sidewalk-Curb-Gutter

Also relatively new in Colorado, although used recently in the newer suburban sections of Denver (and Houston and certain other southern cities), is the integral sidewalk design employed along the urban portion of the project. A single 57-in. concrete slab provides 3 in. of walk, a shallow dip or curb, and 18 in. of gutter width. The design offers only moderate drainage capacity, but has several advantages which appeal to suburban home owners. The entire width can be used either as a walk or as a temporary parking apron for passenger vehicles. The parkway between walk and curb is eliminated, resulting in a greater uninterrupted expanse of lawn.

Isolation of main roadways from the service roads is effected for most of the distance by means of a stout 9-in. thick curb which projects 9 in. above the pavement surface. This curb is carried down 15 in. to a sand cushion resting on the subsoil. Each of the three contractors devised a slightly different type of sectional form in constructing this curb. Considerable care in staking forms and frequent checking with transit and level were necessary to get a curb line true to the eye.

A dry, stiff concrete was specified for curbs to insure maximum strength in event of collision or sideswiping by heavy vehicles. Barricades consisting of ? ? ? ?

Low Bid Prices On One of Three Contracts, 6th Avenue Access Road to Denver Ordnance Plant—1,781 Miles of Multiple Lane Highway

Bids Dec. 11, 1942, Project 67-A(2), Unit No. 2, Const. Div. No. 1, to be completed in 210 calendar days. Awarded to Northwest Engineering Co., Rapid City, N. Dakota.

Item	Unit	Quantity	Unit Price	Total
Clearing & grub. project... Lump sum...	\$.....			\$ 1,700.00
Remove 43 structures.... Lump sum...			550.00
Remove & reset mail boxes. Each	38	3.00		114.00
Adjust M. H. ring & cover. Each	15	25.00		375.00
Adjust valve boxes	59	7.00		273.00
Rem. conc. curb & gutter... Lin. ft.	9,365	.40		3,746.00
Rem. conc. curb, alley.... Lin. ft.	480	.40		192.00
Rem. conc. gutter, alley... Lin. ft.	320	.40		128.00
Rem. conc. sidewalk	10,280	.15		1,542.00
Rem. conc. pvmnt., alley... Sq. yd.	210	.20		42.00
Rem. & reset inlet gr. & frame	3	8.00		24.00
Remove fence	1,500	.05		75.00
Remove & rebuild fence... Lin. ft.	5,000	.08		400.00
Tr. wd. line posts	75	1.35		101.25
Uncl. excavation	93,000	.37		34,410.00
Uncl. ditch excavation Cu. yd.	260	2.00		520.00
Select material	46,600	.50		23,300.00
Dry rock exc. strl.... Cu. yd.	800	3.00		2,400.00
Dry com. exc. strl.... Cu. yd.	7,200	1.25		9,000.00
Wet rock exc. strl.... Cu. yd.	100	6.00		600.00
Wet com. exc. strl.... Cu. yd.	800	3.00		2,400.00
Mechanical tamping	216	3.50		756.00
Rolling fills	1,070	3.00		3,210.00
Furnish roller	4	50.00		200.00
Wetting fills	1,430	2.00		2,860.00
Sta. yd. overhaul	322,000	.015		4,830.00
Yd. mile overhaul..... Yd. ml.	15,000	.20		3,000.00
Gravel surfacing	43,500	1.40		60,900.00
Overhaul select material... Ton ml.	267,000	.08		21,360.00
Conc. pvmnt., alley	60	3.20		192.00
Sand cushion	460	2.75		1,265.00
Misc. untr. timber..... M. B. ft.	0.9	200.00		180.00
Misc. tr. timber..... M. B. ft.	2.5	250.00		625.00
Class "A" concrete..... Cu. yd.	101	35.00		3,535.00
Class "B" concrete..... Cu. yd.	41	35.00		1,435.00
12" conc. culv. pipe..... Lin. ft.	383	3.00		1,164.00
18" conc. culv. pipe..... Lin. ft.	402	3.50		1,407.00
24" conc. culv. pipe..... Lin. ft.	1,675	4.25		7,118.75
18" vit. clay culv. pipe... Lin. ft.	11	4.50		49.50
Gr. st. & ditch pvg., 12" th. Sq. yd.	35	12.00		420.00
6" vit. tile under dr..... Lin. ft.	518	2.25		1,165.50
8" vit. tile under dr..... Lin. ft.	425	3.00		1,275.00
6" vit. clay pipe dr. std. Lin. ft.	170	2.25		382.50
R.O.W. markers	30	5.00		150.00
Conc. curb dble. fed..... Lin. ft.	12,700	1.40		17,780.00
Conc. curb single fed..... Lin. ft.	670	1.20		804.00
Conc. curb, alley	100	2.00		200.00
Conc. gutter, alley	410	1.80		738.00
Conc. comb. curb, gutter & sdwk. Lin. ft.	9,440	2.00		18,880.00
Conc. comb. curb & gutter st. ret. Each	61	40.00		2,440.00
Conc. comb. curb & gutter trans. Lin. ft.	1,050	1.70		1,785.00
Conc. comb. curb & gutter alley ret. Each	50	25.00		1,250.00
Tr. gds. wd., 18" siphon... Each	4	8.00		32.00
Tr. gds. wd., 24" siphon... Each	2	10.00		20.00
Conc. sidewalk	690	.25		172.50
Timber gd. posts	207	3.00		621.00
Timber gd. posts, 8".... Each	145	4.00		580.00
18" reinf. conc. siph. pipe. Lin. ft.	164	4.00		656.00
24" reinf. conc. siph. pipe. Lin. ft.	112	4.60		515.20
6" std. cl. valve & pipe cons. Each	2	75.00		150.00
Type "B" manholes..... Each	14	125.00		1,750.00
Type "A" manholes..... Each	2	140.00		280.00
12" vit. clay sewer pipe std. Lin. ft.	1,306	1.65		2,154.90
15" vit. clay sewer pipe std. Lin. ft.	660	2.30		1,518.00
18" vit. clay sewer pipe std. Lin. ft.	304	2.90		881.60
21" vit. clay sewer pipe std. Lin. ft.	610	3.65		2,226.50
24" vit. clay sewer pipe std. Lin. ft.	2,320	4.50		10,440.00
Alternate Bids for Concrete Sewer Pipe in place of Vitrified Clay Pipe. Sub-total above less items 12", 15", 18", 21" and 24" Vit. Clay Pipe Std.				
12" non-reinf. conc. s. pipe. Lin. ft.	1,306	\$ 1.65		\$ 2,154.90
15" non-reinf. conc. s. pipe. Lin. ft.	660	2.30		1,518.00
18" non-reinf. conc. s. pipe. Lin. ft.	304	2.90		881.60
21" non-reinf. conc. s. pipe. Lin. ft.	610	3.65		2,226.50
24" non-reinf. conc. s. pipe. Lin. ft.	2,320	4.50		10,440.00
Sub-total				\$265,247.20
Plus 10% Eng. & Contg's.....				26,524.72
Total Conc. Sewer Pipe.....				\$291,771.92

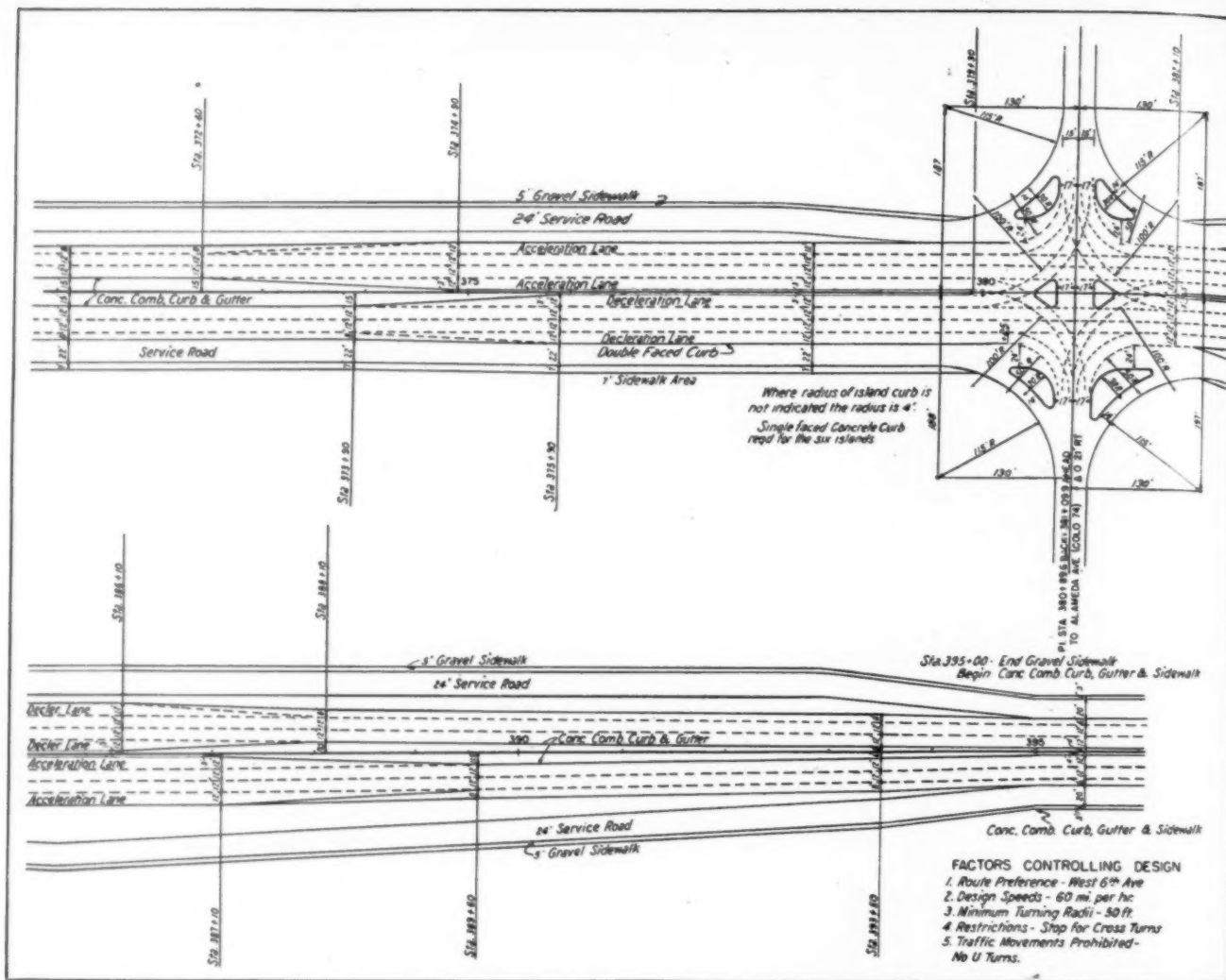


Fig. 5. At Sheridan road, the most important intersection, traffic is channelized and flow aided by acceleration and deceleration lanes

of two or three creosoted wood posts and railing were provided at junctions with local side streets, the posts being set in gaps in the curb. Railing is to be given the standard yellow and black paint striping required for barricades and warning devices.

Sheridan Road Intersection

At the principal intersection, Sheridan Blvd. at the city line, detailed traffic estimates, layout and engineering studies were made to prevent this junction from acting as a bottleneck. The resultant design provides for two additional 12-ft. lanes in each main roadway approaching the intersection, for acceleration and deceleration. Turning traffic is guided by a channelizing scheme as shown in Fig. 5. The design anticipates an average 24-hour volume ranging from 500 to 4,100 vehicles in each of twelve directional paths. Unbalanced demands at plant shift time of course will put this intersection to the critical test.

While the wartime speeds are reduced, the paths of acceleration and deceleration laws were designed for 60 m.p.h. max.

Contractors on the 6th Avenue project were Northwest Engineering, of Rapid City, N. Dakota; Lowdermilk Bros., Denver; and J. H. and N. M. Monahan, Denver. Williams and Stice subcontracted the curbs from Monahan. Superintendents for the four above-named firms were, respectively, George Shelp, Hoyle Low-

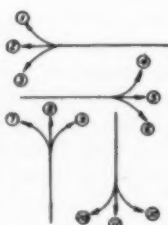
dermilk, Claude Emerson and Mr. Gamble. All work was contracted except processing of the oiled surface, which was done by the state highway maintenance forces, using material furnished by the contractors.

The funds for this entire project were obtained variously for the three contract sections: One section on regular Federal Aid of 78.33 per cent for construction and 56.66 per cent for right-of-way; another, same percentage except funds were available from the "Defense Act of 1941"; and for the third, funds were 100 per cent Federal and both construction and right-of-way, not to exceed \$200,000, were from the "Defense Act of 1941."

The project was designed and supervised by the state highway department, with Fred Miller, state resident engineer, and D. W. Ormsbee, state construction engineer in charge of construction. Charles D. Vail is state highway engineer of Colorado.

AVERAGE 24 HOUR VOLUME	TOTAL*
MOVEMENT	
1	1000
2	4700
3	1000
4	4700
5	1000
6	4700
7	1000
8	4700
9	1000
10	4700
11	1000
12	4700

* Anticipated Traffic Volume



Traffic volume and flow paths on which Sheridan Blvd. intersection design was based

COLD WEATHER PROBLEMS

V—Plantings Cut Drifts in Gogebic County

[Continuing a series of winter articles. Readers are invited to comment on their snow and ice problems, particularly on the steps they have taken this autumn to make the best use of available equipment.—Editors.]

Over in the Western corner of Upper Michigan, Gogebic County had an equally hard time last winter. The big drama was the battle with a snow-fall of 231 inches, far exceeding all records. The average annual fall is 149 inches.

Snow fighting for a time eclipsed a more quiet drama—that of the planting and gradual growth of thousands of little trees along the roadside to reduce drifting. But before going into this subject, first a few words about Gogebic's snow removal methods and equipment and its experience of last winter.

Gogebic County also clears state trunk roads as well as local lines, 540 miles in all. In spite of wartime problems this county finally opened practically 100 per cent of its usual plow routes.

But not without some delays and extraordinary effort. County Highway Engineer, George W. Koronski, who still vividly recalls the paralyzing storm of 1938, was also hit by the storm of 1942 Thanksgiving Day. By eleven P. M. that night he was able to reach town ten miles away and meet his foreman and get organized. Trucks immediately became stuck and

other trucks had to be sent to the rescue. From that night on for weeks it was a continuous battle, which not only exhausted the men but broke down much-needed equipment that was laid up the rest of the winter for parts.

17 Snow Districts

Snow removal in Gogebic County is divided into seventeen districts or routes, from 7 to 30 miles long, each assigned to a man and a crew. Some routes are given one plow, others two. Crews work out of four district garages so that usually no plow has to travel more than 20 miles to get over its assigned section.

Each district garage is under a foreman in complete charge. The County's main garage at Bessemer is under the county engineer assisted by the assistant engineer and general foreman. As in all severe storms these men worked 16 to 18 hours daily throughout the emergency, in order to have the proper overlapping of staff supervision.

Ordinarily as the first snow gets under way in this county, the men go out with under-blades or patrol graders. Then with 1½ and 2-ton trucks

carrying one-way blades. These trucks can handle everything through the early winter until the first real storm.

With deeper snow, out come the V-plows and heavier trucks. Formerly tractor-plows were used, but none have been purchased since 1939 because of their slow speed and the development of better heavy-duty snow trucks and throwing equipment.

However, the county maintains a balance of equipment, including light and heavy duty snow-throwing units mounted on 2 and 4 wheel drive trucks; V-plows on heavy trucks, and push-plows mounted on motor graders.

What Plow Is Best?

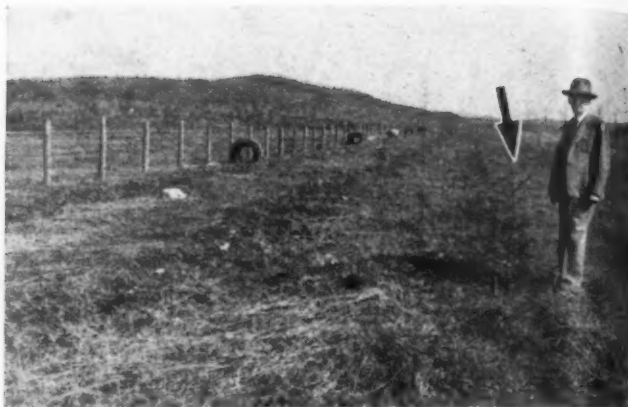
One or two heavy-duty truck plows are all that is considered necessary in conjunction with the county's single Sno-Go. In answer to the familiar question, "What is the best type of plow?" Koronski answers "No one type." A heavy-duty truck is equipped, first with a heavy-duty one way plow, second, with a heavy-duty high-speed plow, third, with right and left wings. He considers the shape of the plow of critical importance in speeding up the work, cutting down push-



This is not just an exceptionally attractive piece of roadside landscaping for the pleasure of tourists, but a "living snow fence" that saves Gogebic County and the state large sums in drift prevention. (Along U. S. Route 2 near Ironwood)



Left: How the trees do their stuff in winter. Note absence of drifts, at a point where wind formerly piled the snow high. Right: George W. Koronski, Gogebic County Highway Engineer, snapped while inspecting a recent planting along 200-ft. right of way. Trees are ten feet apart in both directions. Arrow marks nearest of one line of trees; a second line of seedlings is planted closer to the fence.



ing effort and saving wear and tear, and has reshaped numerous plows. A 52-degree rake or angle of the apron with the road is regarded as best for cuts on a 9-ft. swath.

Gogebic County practice is to widen out as far as possible toward the ditch line immediately after each storm. This is done with wings, either hydraulically operated or stationary wings in front of the back wheels. It is especially important to push the banks well out in spring-time. The county has cut spring maintenance costs by winging roads down to the ditch line just as the big melt starts. Huge drifts are undercut. All this helps the snow vanish sooner along the ditch lines and gets water out of the ruts.

Sanding Practice

Sanding is a big part of the winter job. All sand pits in the county are spotted on a map and a procedure worked out for getting sand quickly to all vital points. However, continuous sanding, rather than spot coverage, is preferred. Two cubic yards per mile is applied from trucks traveling 8 to 12 miles an hour, thus covering a large mileage quickly and if necessary frequently.

At curves and hills continuous sanding is reinforced with local applications, taken from 10 or 15-cubic yard piles of material containing 100 lb. of chloride per yard of abrasive. When weather favors, the whole crew of a district will put in short evening periods sanding. Sand is applied after dark only in emergency, to avoid traffic hazard. Every truck is equipped with a sander.

Sanding costs the county about \$7,000 annually, or approximately \$1.60 to \$1.75 per yard of abrasive involved.

65 Miles of Fence

Gogebic County, too, is a big user of drift fence. Much of its fence is

two-tier construction (8 ft.). A great deal of observation has been given to the best placement of available fence, and careful comparative costs kept of snow removal expense with and without fence protection. Figures for a recent 12-year period, in which the county's snowfall averaged 149 inches, show that properly sheltered roads cost only \$78 per mile per year to clear, while semi-sheltered sections cost \$110, windswept road with fence cost \$181, and windswept sections without fence cost \$350.

This county, too, has had wartime labor difficulty. Farmers were paid 50 cents per 100 ft. for erecting and 50 cents for taking down, being asked to do so at this low price for their own welfare. Handling fence costs \$6,000 annually. Much fence here needs replacement.

Thousands of Trees

If engineer Koronski is more interested in one part of his work than another it is in "living fence". In his nearly twenty years of service in the county he has done much to bring about the acquisition of 200-ft.-wide rights of way, needed to make room for drift prevention installations and permit wide forest clearings. Recently six miles of 200-ft. rights of way was acquired.

Some of the early plantings done by the county along seven miles of state truck route U. S. 2, are today well advanced and are things of beauty as well as a source of definite economy. These earlier plantings could well have been charged off the books in one recent storm alone, it is estimated.

Both natural and nursery stock are used in setting out trees. A typical planting is spaced in six rows spaced 10 ft. apart paralleling the roadway.

The chief trouble in planning and developing protective growths is interference by abutting property own-

ers, who want trees thinned out in front of their places. It is sometimes necessary to trim lower branches for sight, but this lets drift through.

Tree planting has gained in public interest, as part and parcel with reforestation and preservation of timber resources. The school children of the city of Ironwood recently were given a holiday to aid in setting out seedlings under the auspices of local civic organizations.

Plows Aid Ski Maneuvers

A variation in the usual winter routine took place unexpectedly last winter when the U. S. Army sent through a hurry call to Gogebic and four other counties to open up forest roads and trails for a ski encampment. Over 150 miles of road blanketed three to four feet deep on the level were cleared in early March. These roads ordinarily are closed until late spring. The first push was done with heavy V's, followed by Sno-Gos and one-way plows, as with ordinary road work. In spite of the prevailing cold (-10 to -30) the ground was found to be unfrozen due to the snow covering, and much difficulty was encountered in the soft going before the crust formed.

Gogebic County, with 540 miles of deep plowing, can't fool with too-light equipment. Five-ton and larger trucks bear the brunt





Chains are tagged for their proper trucks and kept in readiness as winter sets in. Over 4,000 lin. ft. of tire chain is bought annually by Gogebic County. Chains are made up in the shop using a hand link closer

State Plows Trunk Lines in Some U. P. Counties

In the final analysis the responsibility for keeping state arterials cleared in the 400-mile-wide forested expanse of Upper Michigan rests with the state highway department. However, because county road organizations are so highly organized, have shown a special familiarity with local snow problems and have developed such efficient service, trunk line clearance in 12 of the 15 northern counties is handled by the county forces under non-profit contracts. Arrangements for this work are handled under Charles Ziegler, State Highway Commissioner.

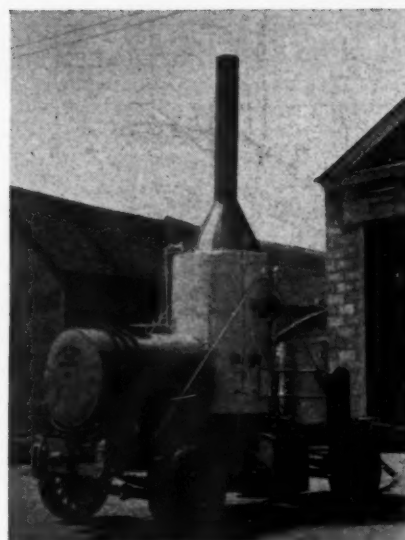
State road men are frequently out on the roads, keeping in touch with all trunk line snow work. The State's equipment includes two rotaries, assigned to two counties having heavy need, and extensive plow and blade equipment.

State snow and ice removal also take in trunk lines through cities. Funds from state highway revenues are allocated to cities under a state-

wide plan of paying 80 per cent of the cost for cities of 20,000 population, graduating down to 50 per cent for cities over 50,000. In communities under 20,000 not having snow contracts the state plows trunk lines the full paved street width, parked vehicles permitting, and aids in removal of accumulated snow when necessary, the rural snow removal work having first call for men and equipment however.

County allotments are on a "inch-mile" basis, thus varying with average snow depth as well as mileage. The state has approximately \$200,000 a year to divide between counties having over 60 inches average total snowfall.

The state maintains an unusually complete forecast and warning organization. During the storm season the final link in this organization is the patrol car. The foreman's pickup at night is driven by an equipment operator who is a good judge of when to begin removal operations.



Not a Ringling Bros. steam caliope, but a frost boiler fashioned by the Gogebic County shop men under foreman Billy Rice. Used to thaw out culverts in the spring, and to heat bulk road oil, it includes a home-made oil burner with a full complement of automatic controls, a gasoline-powered light generator, a specially designed chassis, and the wheels and axles from a 1918 model Peerless truck

The foremen and superintendent usually stagger their alert time. State recommendations are for trained maintenance employes (not casual help) to be divided into two crews in a district, or county, each crew having both equipment operators and laborers.

Pre-Season Preparation

In the fall all snow fighting equipment is ordered to be through with summer overhauls, properly equipped and in readiness. Plow frames are mounted in the trucks, hoists in good order, supply of shoes and edges on hand, tire chains hung on trucks or tagged on racks. Flares, blinker lights, tow chains and other safety devices are placed for fast handling. Sno-Go attachments are mounted on trucks and their operation checked.

Some plow trucks are loaded with



Ironwood's city engineer, Wm. L. Johnson, poses for his picture in "workin' clothes" (center), while out with school children, supervising the setting of seedlings for roadside snow protection. With him are Leon Luke and R. F. Rossati of the Michigan state highway department



Fig. 2. Average annual snow fall in Michigan for period of record through 1940. Last winter's fall far exceeded the averages

1½ cu. yd. of chemically treated sand to aid traction while plowing.

In the Autumn, too, all other equipment such as sanders, underbody blade attachments, power loaders, power shovels, safety hand rail, etc., is supposed to have been inspected and ready for the first emergency. These advance precautions are obvious, yet time creeps up and good management dictates that they be ordered well ahead and checked along the line.

Stockpiling of abrasives and other preparatory work also takes time. The state's instruction manual includes warning not to place chloride-treated material where tree roots may be damaged, or to place it anywhere without first obtaining permission of property owners.

In the Upper Peninsula actual removal operations by the state forces follow customary procedure. The state's problem this coming winter, along with that of the counties, will be to nurse equipment along with a minimum of breakage involving irreplaceable parts, and to keep going in spite of skimpy crews.

Yet the Upper Peninsula's county trunk roads, as well as many miles of local roads and streets, must remain open if vital copper and iron mining and timber production of the region are to continue.

Snow removal in Upper Michigan for the state is under the direction of District Engineers R. F. Rosatti and Donald Miles, located at Crystal Falls and Newberry. Leon Luke is state engineer of contract maintenance and B. R. Downey, state maintenance engineer. Charles Ziegler is state highway commissioner of Michigan.

\$100,000,000 Spent On Canadian Airports

The Canadian War-time Information Board reports that since the war began, more than \$100,000,000 has been spent on 286 aviation projects, including the construction of 146 air-dromes and extensive improvements to 51 others. This money has been administered by the Air Service Branch of the Department of Transport.

ODT Requests Reduction in Plow Mileage

The Office of Defense Transportation district office at Green Bay, Wis., has asked the county road commissions of the district to eliminate snow plowing on outlying roads except where absolutely necessary. Each county has been asked to advise the ODT of the routes it expects to keep cleared this winter.

In discussing this matter with ROADS AND STREETS, Edward J. Konkol, district manager at Green Bay, said: "We desire to review the snow plowing program in all of the counties in our district to determine whether only primary and secondary highways carrying traffic essential to the war effort or civilian economy are to be kept clear of snow.

"In the past many counties have developed a plan of plowing out certain outlying highways, private driveways and narrow rights of way, which in many instances resulted in breakdown of equipment, burning of excess gasoline and damaging of tires. Due to the critical shortage of trucks, tires and parts made from critical materials and manpower, it is our purpose to eliminate unnecessary snow plowing wherever possible.

"We, therefore, have requested each of the counties to submit a map of their highways showing thereon the routes they propose to keep clear of snow during the forthcoming winter. In any instances where outlying highways were proposed to be plowed, we obtained an explanation as to why the county proposed to clear such outlying highways. We found in many instances it was necessary to plow these roads in order to permit milk operations to be conducted, to open mill routes and school bus routes and to permit farmers to bring their produce to market.

"It should be definitely understood that there is no proposal on our part to unduly restrict or limit highway commission operations which may result in hampering the war effort. Due to the experience obtained from the operations last year we know that certain rights of way, private driveways and outlying highways may be eliminated from the snow removal program."

Replies received by Mr. Konkol indicate that most counties have already restricted their plowing, having cut down last winter to a very minimum consistent with serving farmers, loggers, schools, mines and other interests. Sometimes plowing quite a mileage is justified for a very few individual road users.

California's Fighting Roads

How California's highway system is meeting extraordinary demands in volume and tonnage of wartime truck traffic

ONE recent army service plant alone in California required more than a million cubic yards of construction hauling over the highways.

This project is merely one of five hundred war projects completed in the state within the short period of thirty months with highways as construction supply lines.

Even these two statements only begin to give an adequate description of the role of California's highway system in the war effort, according to data recently compiled by the Division of Highways. To complete the picture, one must consider the size of California, and the fact that new airfields, supply depots, training centers, plane factories and other establishments are scattered into every corner of desert, mountain and sea coast, some requiring hundreds of miles of overland trucking of materials, equipment and supplies to build.

Nor does the picture stop there. All classes of highways down to the lowest feeder routes have become food supply lines of greatest importance. And the maintenance and operation of the Army and Navy plants and military movements in general have set up a new pattern of heavy truck hauling that will not diminish or return to "normal" until war's end.

For instance, many scores of isolated satellite airfields must be served by a constant flow of rubber-tired vehicles.

It is nothing at all for the air depot at Stockton, say, to get an off-shore order for goods, and by midnight have a 150 or 200 truck convoy headed for a dock 75 miles away. Trucks are coming more and more into play in the military operations, because of this speed and flexibility—and the existence of a well-built-up highway system that was ready-made when war came along.

General Pershing's prediction that "The country road will be of tremendous value in time of war; the roads must be relied upon to obtain needed food and supplies," is revealed by these and other figures to be truer than he ever dreamed.

State-wide Study of War Role

The state's \$25,000,000 access road program can only supplement the

[Editor's Note: The California Division of Highways this year is continuing with an \$8,000,000 2-year repair and reinforcing program involving several hundred miles of pavements. Its preventive maintenance program has also been stepped up as availability of funds, materials and personnel permit; see **ROADS AND STREETS**, August, 1943, for article by T. H. Dennis, State Maintenance Engineer, on California's enlarged mud-jacking program. The method used in a typical contract resurface and repair job will be presented in an early issue.]

highway system in this service. Pavement deterioration resulting from the increase in weight and volume of high-speed trucking has been computed at ten million dollars, and this year's funds available for construction have been assigned practically 100 per cent to finance a \$3,500,000 heavy repair program. Over \$4,500,000 was spent for this work in 1942.

Because of the serious problems confronting the Division of Highways it became necessary to determine in some detail the part that roads are playing in the war effort. California's situation is in many respects unique. It is the nation's second largest state, with 159,000 square miles strung out over a tremendous north-south distance. It is sparsely settled, with only 44 persons per square mile, in spite of its seven million population. And each mile of road must serve 2½ to 3 times the area compared with roads in densely populated eastern states. In a word, the state that was picked as one of the greatest areas of military activity, is also most dependent on highway transportation.

Further complicating the problem is the fact that hardly a county is without its share of war activity, and that four-fifths of the urban population (and nearly two-thirds of the total) is concentrated in the three coastal centers of San Francisco, Los Angeles and San Diego—centers far from vital inland projects and long distances from each other.

Roads Often Only Access

The railroads of course haul a tremendous tonnage of freight in Cali-

fornia and all lines are serving at a record-breaking peak. But in numerous areas their facilities have been far over-taxed. And in others there are no rail lines. A large part of California's area lies more than 25 miles from any railroad.

The dependence of the state on truck freighting is shown by the following figures.

In intra-state freight haul, according to the California Railroad Commission data, \$105,000,000 out of \$157,000,000 in freight tariff paid by shippers in 1941 (pre-war year), was paid for truck haul, or 66.8 per cent. The ratio today is undoubtedly still higher.

These figures are for public carriers only, and do not include the vast and fast-mounting flow of goods shipped in vehicles by farmers, wholesalers, oil companies, manufacturers and other private owners. A far greater tonnage of logs and lumber, livestock, minerals, and other such freight is involved. Also petroleum, which under a recent ODT order cannot be shipped by rail for distances of less than 200 miles.

Specific Tonnage Instances

California's 5 billion pounds of milk fat produced this year will move over the roads, much of it to feed the military, and the poundage of butter, cheese and eggs trucked into the three big centers in 1943 will run into the scores of millions.

Movement of the state's 20,000,000 tons of farm and ranch crops to market is two-thirds a trucking problem; of 137,000 carloads of livestock in 1942, the equivalent of 102,000 carloads rode the tires.

Over 45,000,000 tons of petroleum plays a big part in truck movement, and the state's 23,000,000 tons of stone and gravel production last year was almost a 100-per cent trucked commodity. Most was directly used in connection with the war.

Available data shows that probably 1,267,000,000 vehicle-miles of rural truck traffic is generated annually by this state at war. Little wonder that the damage to pavements has been so widespread, since this represents a volume far exceeding that for which most roadbeds were designed.

Axle Load, the Critical Factor

The recent California experience serves to underscore the established fact that continued repetition from heavy axle loads is the determining factor in pavement deterioration. Roads that have carried traffic with little visible ill effect for a long period, under normal maintenance, have gone to pieces rapidly under the unusually frequent heavy-load repetitions involved in construction and commercial hauling.

In construction of airfields and other large military projects the state has had an understanding with the contractors' associations. Load-limit concessions over the legal limit have been made whenever the army or navy has certified the necessity, provided structures would carry the increased load. Gross loads of 76,000 lb. have not been unusual, and some permits up to 120,000 lb. have been granted to aid in moving heavy shovels without dismantling.

For-hire truck owners show a 33 per cent increase in 1941 over 1940, and 32 per cent in 1942 over 1941 with no increase in tax rate. This is an indication, in part, of heavier gross loads as well as more loads, since the number of trucks increased little.

Individual common-carrier shipments for military authorities have increased from an average of 350 lb. to 2,000 lb.

Bus lines, too, are carrying heavier as well as more loads, as shown by their 300 per cent travel increase from 1940 to 1942.

As to examples of rubber-tired traffic, generated by the war, the Kaiser shipyards in the San Francisco Bay area are reported to receive 50 per cent of their freight by truck, and nearly seven-eighths of the employees come to work via highway.

Long-Distance Hauls

Long-distance for-hire carriers particularly have performed a vital service; 47,551 trucks and 13,286 trailers in this work last year plied between distant centers, traveling between San Francisco Bay and Seattle in 30 hours carrying freight that assays 75 per cent war goods. Ogden is less than 30 hours from the Bay. The San Diego-San Francisco run, 17 hours.

Food-for-soldiers, too, generates heavy long-distance truck loads. A hauling firm serving the area from Yuba City to Tulare does 85 per cent of its business now with canneries; hauls up to 185 miles. One special military contract involved 5½ million pounds of food products, hauled 225 miles. A milk producer and processor has 1,300 trailers and semi-trailers.

Another is known to have a 400-mile average haul, and still another a 285-mile run. Most of these loads run 18 to 20 tons, and its fleet has doubled, partly due to a 20 per cent Army "take."

Fruits, vegetables and nuts passed at state border inspection stations to the tune of 15,996 equivalent carloads. Much of this was imported from surrounding states, as were a quarter-million head of livestock in 1942.

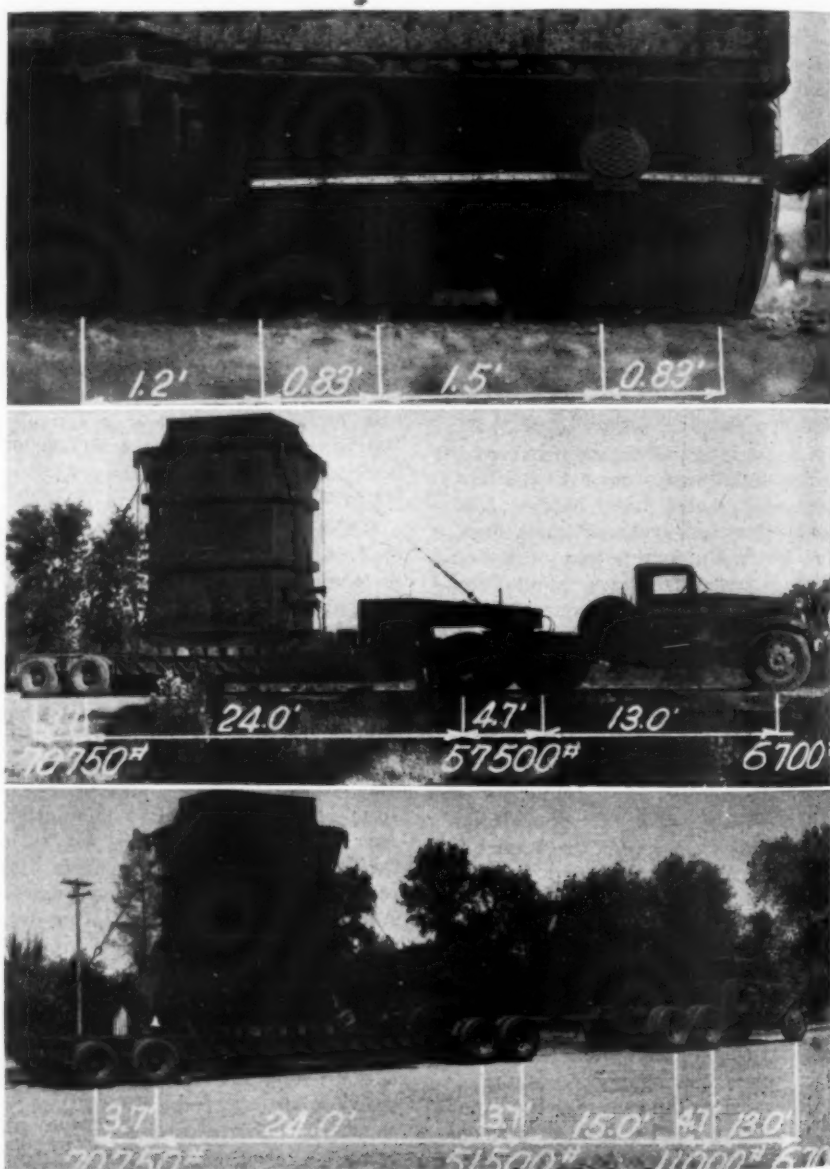
Truck traffic in general at state-line quarantine stations has increased 12.4 per cent over 1940.

Seventy-five per cent of all slaughter house and packing company shipments are by truck; plants at two

large central cities shipped the equivalent of 67,000 carloads by highway.

Over 81 per cent of the 74,467 carload-lots of vegetable receipts at Los Angeles in 1942 came by truck; the same for over 66 per cent of 24,853 carload lots of 38 important fruits received at San Francisco. Fruit and vegetables converge at these points fan-wise by highway from the rich production areas all over the state.

Hay, even, is a major consideration in designing strength into pavements. Over 184,000 tons, mostly in weight-limit loads, moved by truck from the Antelope Valley into Los Angeles in the first half of the 1942-43 season. Hay from Imperial Valley

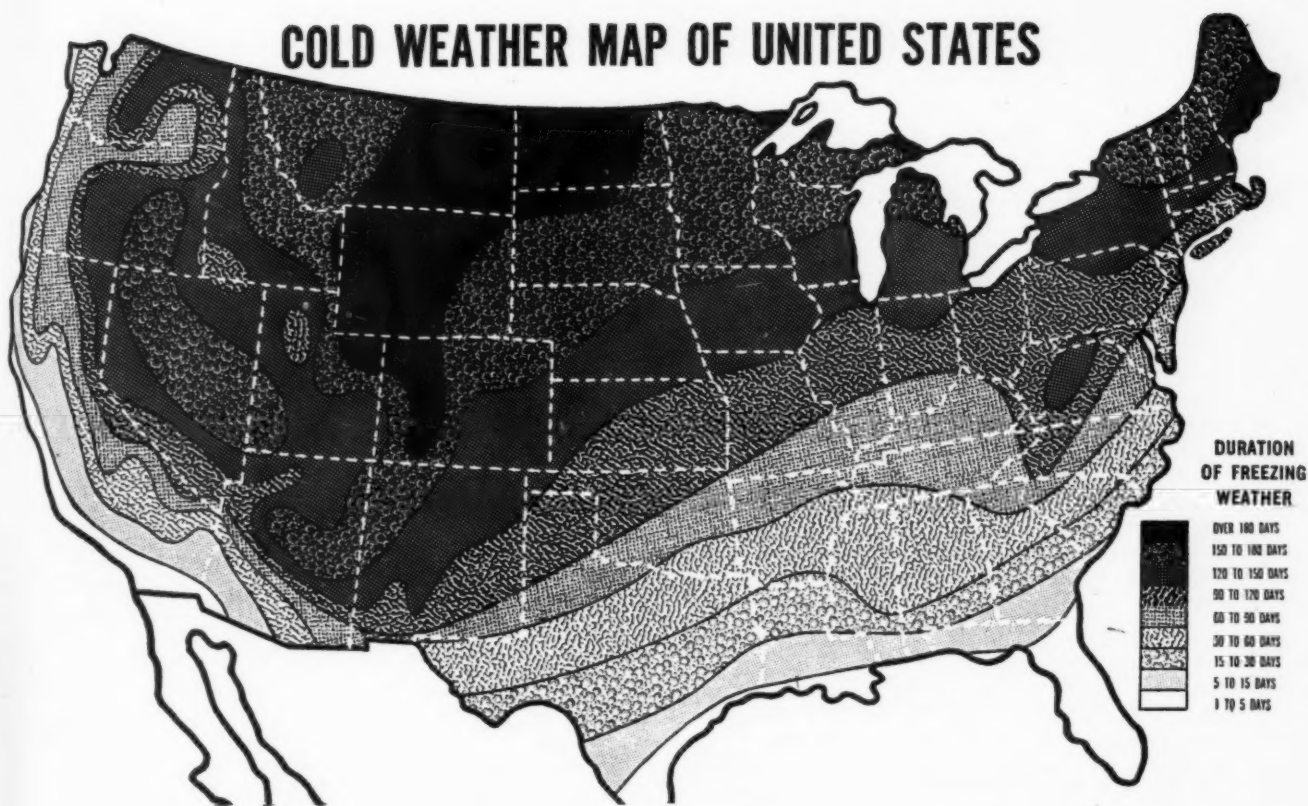


An example of the "special permit" loads that the California Division of Highways has been called upon to handle is this unit for a power plant built in 1942 on the Pitt River. Gross load 134,950 lb.; 70,750 lb. carried on dual rear axle, each axle having eight 15-in. tires. This huge load, as with all such "specials," was required to be weighed at the Division's wayside pit scales before pulling out. Speed was restricted to 5 mph.

Middle view: Loaded for transit over the highways

Below: Showing how an extra dolly was used to space axles farther apart for crossing modern timber bridges enroute

COLD WEATHER MAP OF UNITED STATES



Prepare for Ice Control Before Winter Comes

Jack Frost moves in on us EVERY year whether he is wanted or not and stays as long as six months in some sections of the country, as the above map shows.

Before winter, squirrels store away their food, householders their fuel and farmers their fodder AND foresighted officials do their fall stockpiling for ice control.

Highway departments that prepare stockpiles of abrasives treated with calcium chloride BEFORE WINTER ARRIVES save a lot of grief and expense.

Experience and tests show that 1 load of calcium chloride treated abrasives gives skidproofing effect equal to 3 loads of untreated grits. This means, therefore, that only one-third of the number of trucks and men are needed to do the same job.

Do it the EASY way before the freezeup instead of the HARD way in a blizzard. The EASY way is the ECONOMICAL way.

Abrasives treated with calcium chloride:

- (1) Stay unfrozen. Stockpiles open up easily for handling.
- (2) Load fast and spread evenly.
- (3) Bite into ice, give traction immediately and stay anchored.

Ask for a free copy of Bulletin 27, detailing recommended practice for better, faster, easier ice control. Calcium Chloride Association, 4145 Penobscot Bldg., Detroit 26, Michigan.

CALCIUM CHLORIDE

FAST • POSITIVE • ECONOMICAL

MAKES ICY
ROADS SAFER
•
SAVES UP TO \$6.00
A MILE EACH
TREATMENT

into the same city in a recent six-months' period ran to 184,000 tons. Shipments from other counties swelled the total hay haul to 415,000—a lot of load repetitions on the pavements involved.

Gasoline, Cement, Lumber

One gallon of California's gas in every four used to be delivered all the way by truck, from the refineries, and much of the rest part of the way. The ODT order to divert less-than-200 mile shipments from the rails has more than offset any decrease in the total gasoline consumption since the war. The Army's deliveries of gas to airbases and for shipment abroad is astronomical.

A large cement company's war construction business jumped its truck-hauls in the first quarter of this year to 211,000 bbls.

Eight lumber companies along the north coast with 50,000,000 board-feet production are now hauling this amount by highway 250 miles into the San Francisco Bay area. Their logging operations are running 360,000 feet (2,900,000 lb.) daily, with 10 to 50 mile haul to the mills. All this is for war, and three mills with nearly 200,000,000 board-feet production are going full blast via truck haul in the Sierras. Lumber haul over roads has tripled since the war.

A chrome and manganese producer moved 1,000 tons 85 miles by truck to a war stockpile.

New Jersey Has Big Post-war Bridge Job

The most detailed road survey ever inaugurated in New Jersey has revealed that 717 bridges are of inadequate carrying capacity and 704 others are too narrow, Sigvald Johansson, head of the Highway Planning Bureau, reported. The survey, which was limited to bridges of over 20 ft. span located outside of urban areas, has shown that out of a total of 2,272 bridges surveyed, a third were not able to carry safely a 10-ton loading.

No survey has been made as yet of bridges in urban areas or of bridges less than 20 feet in span, but it is evident that many of these also must be deficient.

Another New Jersey highway department bulletin reports that from estimates made in 1935 by the New Jersey Public Utilities Commission and corrected to date, there are 157 grade crossings in the state that are worthy of prompt attention. In addition, on state highways 17 present railroad bridges over highways and 11 highway bridges over railroads are reported inadequate and in need of

reconstruction, and similar conditions exist on other highways. The inadequacy is due to dangerous alignment of the highways and similar causes.

Texas Making Post-War Progress

We have made a very careful inventory of the State of Texas on road needs, writes Texas State Highway Engineer D. C. Greer. This includes the designated highway system, important farm-to-market, or feeder road projects and important municipal projects. This inventory reveals that in the immediate post war years we have a minimum of \$542,250,177 of such work that should be done as early as possible in order to care for our road needs. From this inventory we have selected projects in the amount of \$111,580,000 as the most meritorious and have started our engineering work on this increment. We have completed surveys on a portion that reveals a monetary value of \$34,000,000.

Our designs are now complete on approximately \$16,000,000 of work, although we feel that within a period of thirty or sixty days we could logically have thirty to forty million dollars of these plans ready for contracting.

As is no doubt true in all of the states, our greatest handicap is personnel limitations. We have been reasonably successful in overcoming this handicap by a constant training program of new employees consisting of women, older men, etc. We are well pleased particularly with the success we are having with girls in our drafting rooms and even on some of our field parties.

It has been our thought that if we can get the engineering design features agreed upon by all concerned, location established and right-of-way secured, then certainly fifty per cent of the development of the project has been assured. These features are the work that require the minimum amount of personnel and it is for this reason, generally, that we are able to show a reasonable degree of accomplishment, at least through this phase of the work.

Retires After 32 Years

Felix O. Beazley, Director of Public Works of Nashville, Tenn., has retired after 32 years with the city. He entered the City Engineering Department at the age of 19. In 1923 he became Assistant Field Engineer. In 1931 he was promoted to Construction Engineer and became City Engineer in 1934. In 1943 he became Director.

Skelly Heads Pennsy. Postwar Committee

James J. Skelly, of Media, Pennsylvania, outstanding good road leaders, has been appointed chairman of the Pennsylvania Post-war Highway Committee, according to E. R. Snyder of New York City, chairman of the nation-wide postwar public relations committee of the American Road Builder's Association.



James J. Skelly

Mr. Skelly, aided by some 50 committee and sub-committee members, will investigate state, city and local highway needs with the objective of assisting in the formula-

tion of a post-war construction program consistent with those needs. Emphasis will be placed on the urgency of getting final blueprints ready for highway projects. The state work will be integrated with the nationwide A.R.B.A. program.

In accepting the chairmanship, Mr. Skelly said, "To make up for lost time, and to get the roads we need for traffic, it is evident that the state, cities and local communities must just about double their normal highway programs. In doing that, large numbers of jobs will be available for returning soldiers and released war workers. No one knows just how serious the postwar problem will be, but one thing is certain, we must be ready with plans for vitally needed highway projects. We cannot afford another period of relief work which results in so little benefit for worker or public."

Mr. Skelly is president of the Associated Pennsylvania Constructors and of the Highway Contractors' Division of the American Road Builders' Association.

Wisconsin Accumulates Big Road Reserves

The Wisconsin highway commission will have nearly \$70,000,000 in banked funds for post-war construction, according to Chairman W. H. Armstrong. This sum will represent accumulated county and state funds and increased federal aid allotments anticipated. The commission is pushing plans for reconstructing or modernizing numerous traffic arteries and secondary roads and elimination of certain toll bridges.



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and the services that go with them

TECO Design Service

Teco has available for distribution to architects and engineers complete data on all phases of timber design, including tables and charts on timber beams, columns, floors, connector loads, bolt loads, stresses, etc.

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Teco maintains a staff of engineers to consult with architects and engineers on their design problems. Teco Connector distributors and fabricators in all parts of the country also render helpful services to architects and engineers.

TECO Typical Design Service

"Typical Designs of Timber Structures"—a 100 page book—is available to architects and engineers free upon request. Copies of several hundred other designs of typical Teco Timber Structures are also available on request.

TECO Research Service

Teco conducts a continuous research program as well as sponsoring research at outstanding engineering colleges and laboratories to increase the design knowledge of timber designers. The benefits and results of this research are passed on to interested individuals in the form of design data and improved products.

Specifications: Specify Teco Connectors and grooving tools by name. They are endorsed by leading lumber manufacturers and fabricators.

TIMBER ENGINEERING CO.

National Manufacturers of **TECO** Timber Connectors and Tools
WASHINGTON CHICAGO PORTLAND MINNEAPOLIS

Specify Them!

Selling the Postwar Highway Program

The highway industry has received the American Road Builders' Association's plan with enthusiasm that generates action. With the broad principles generally accepted, the job ahead is one of *placing the plan in effect*.

To have the Postwar Highway Program ready to go when the war ends will require active and continued work by the highway and allied industries. Many states, cities and counties are confronted by legislative and financial handicaps that prevent them from doing their share in building up an adequate highway program. Equally important is the fact that many governmental agencies so far have been reluctant or unable to proceed with the preparation of final plans and specifications. Moreover, many communities have been negligent in building up reserve funds for immediate postwar usage.

To better meet these obstacles the Association expects to establish, through its National Postwar Highway Committee, a nationwide educational campaign. This campaign will be localized through state committees.

National Postwar Committee and Sub-Committees

The National Postwar Highway Committee, representing all units of the highway construction industry and profession, has undertaken the task of collecting data and making special studies necessary to round out the postwar highway program. National Committee work has been facilitated by dividing ten sub-committees.

Sub-committee work is well advanced, and material of great value is being assembled. Data and recommendations of sub-committees will clear through Association headquarters and the Executive Council for study and usage by the Public Relations Committee as occasion demands.

The Sub-committees:

1. Needed Work—(State, County, City, Federal).
2. Availability of New Equipment.
3. Availability of Used Equipment.
4. Individual Enterprise—(Contract System).
5. Unemployment—(Numerical and Geographical Locations).
6. Private Investments—(Where coming from).
7. Public relations.
8. Coordinating Committee—(With other groups).
9. Legislation.
10. Highway Finance.

State Postwar Committees

To localize the promotion work, to determine and solve local financial and legislative problems, and to assure development of adequate state and local highway programs, it will be necessary to establish *state* Postwar Highway Committees. These will work closely with the National Committee and the Association's staff, interchanging advice, suggestions and samples of work.

Each state chairman will appoint committee members concerned with legislation, finance, and promotion. It is recommended that the committee membership be composed of sub-committee chairman and advisory members. Each chairman should be aided by enough assistants to carry on the work quickly and easily.

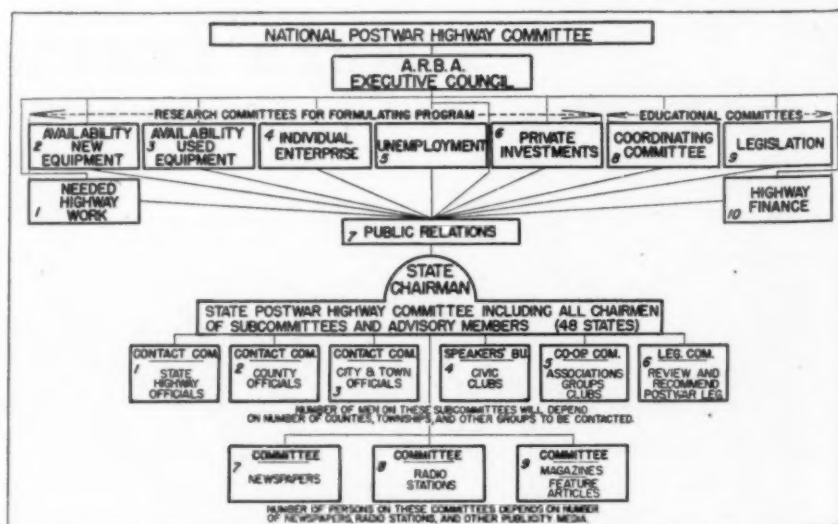
Organization and Duties

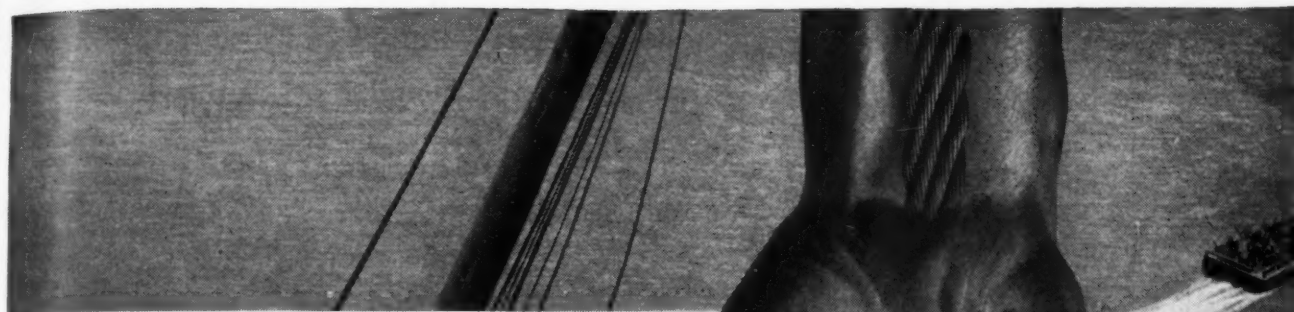
The chart shows a suggested state committee organization. Following is a brief description of sub-committee work.

1. *Contact Committee, State Highway Officials*—To do everything possible to aid and stimulate the highway department to create a large reservoir of final plans and specifications for highway projects.
2. *Contact Committee, County Officials*—To work with county officials, arousing their enthusiasm and urging large stockpile of projects.
3. *Contact Committee, City and Town Officials*—Only intense promotion will produce blueprints for the tremendous backlog of projects existing in cities and towns.
4. *Speakers' Bureau*—Probably the most effective state work of the State Committee will be

accomplished through this Bureau, which should be set up to provide speakers and speeches to reach civic clubs, fraternal organizations, engineering groups, trade associations, etc. Should be so organized that *most of the leading citizens of the state will be contacted directly*. News releases based on the speeches should find ready acceptance.

5. *Cooperative Committee*—Has important function of establishing relationships with planning commissions, civic clubs, Chambers of Commerce and other groups that may be engaged in postwar planning activities. Objective: to obtain the rightful place of highway construction in any postwar program.
6. *Legislative Committee*—Should carefully study legislation affecting state, city, county, and local highway construction; and determine if there are legislative or financial handicaps, if new legislation needed, and remedies necessary.
7. *Newspaper Committee*—Probably will be composed of interested publicity writers, editors, publishers. Should map program to reach all papers in state with articles gauged to stimulate official and public interest in taking the steps for postwar program.
8. *Radio Committee*—Will contact radio stations, and work out a schedule of free time for speeches by prominent men.
9. *Magazine Committee*—Should prepare feature articles for magazines circulated in the state and arrange for all possible assistance by advertisers who may devote space to the highway program.





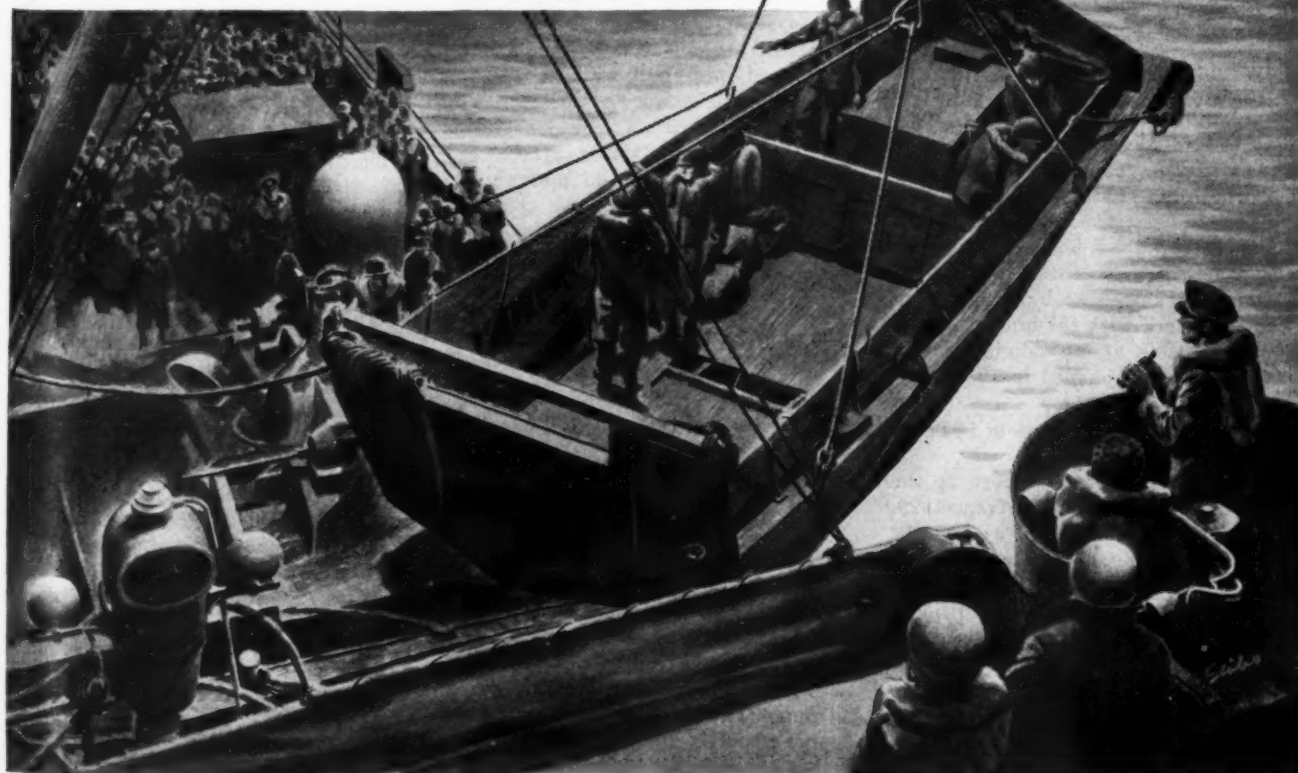
No other war had landing barges like these

nor the modern
Preformed wire rope
 to handle them

To swing a landing barge over the side and set it safely down on the water—that's another new problem of this new, hard, global war. Again Preformed Wire Rope has been selected, this time for the rope and slings that handle the barges. There seems no end to the war uses of Preformed.

In peace, men learned that Preformed Wire Rope could be depended on for greater stamina, longer life, protection of men and equipment, and lower cost. In war, such qualities are indispensable. So at *all* times Preformed is given the hard jobs. For detailed reasons—

Ask your own wire rope manufacturer or supplier





The Municipal Airport at Burlington, Vermont, represents a quarter-century of gradual growth

Evolution of a Small City Airport

Year-by-year improvements made with least financial strain on city; notes on runway construction

MILITARY airports built "overnight" are so commonplace these days that one is apt to forget that some of the country's best municipal airports represent a gradual evolution. Such is the case with the Municipal Airport at Burlington, Vermont (commonly known as "The Queen City" of Vermont, on Lake Champlain), which was started back in 1920 when barnstormers were the sole hope of aviation.

In that year a start was made toward clearing landing spots for light planes. Horsedrawn road graders were used to level the corn and potato hills and a steam roller to compact the soil where the land had last been used for farming purposes; and Burlington began to be known locally as a small city where planes could always land. A temporary wooden building which was purchased with the land was used for some time as an administration building until it burned in 1931.

Modern Airport Began in 1929

Construction of an airport in the real sense however dates from 1929, when the city constructed a 60x80-ft. sheet metal hangar, at a cost of \$8,500. A small administration building soon followed, and then an additional 100x120-ft. wood frame hangar. In 1934 came the first runway surfacing, consisting of 2,250x100 ft. of the present N. S. strip. In 1935 the E. W. runway was constructed 2,500 ft. long, 100 ft. wide with under-drains, con-

By **GEORGE C. STANLEY**

City Engineer and Superintendent of Streets,
Burlington, Vermont

necting with the drainage system for the N. S. strip.

In succeeding years, additional paving was placed, until today there are two runways 3,600x150 ft. and one runway 4,300x150 ft., together with a 250x350 ft. apron and complete lighting system. All runways are of one general asphalt type with asphalt stabilized base and asphalt wearing surface. The surface of the N. S. and E. W. runways are of the penetration (1½-in. "Armor Coat") type, while the N.W./S.E. is a cold plant mix 3 in. in thickness. The base construction of the original portions of the N. S. and E. W. runways was only 4½ in. compact thickness, while the extended and widened areas as well as the N.W./S.E. runway constructed in 1941 was constructed 6 inches in thickness.

New Additions This Year

And this evolution still continues. Plans are completed and contracts have been awarded under a \$135,000 CAA grant which includes the construction of two 50-ft. concrete taxiways with a total length of approximately 7,000 ft. plus the clearing, grading, drainage, and top soiling.

Burlington Airport is a small field, as fields go. The total area comprises about 425 acres. The facts of significance about it are that the airport is adequate for the civic needs of Bur-

lington, that it serves an important function in New England aviation—and that its year-by-year development at no time has placed a severe financial burden on the city. The field today is a port of entry from Canada, on the main airline between Montreal and New York, and between Montreal and Boston, and connects with Albany and points west as well as several N.E. cities such as Montpelier, Concord, Manchester, etc. In addition to serving Colonial and Northeast Airline ships, the field has made possible the rapid development of Burlington as an Army Air and Pilot training center. The "Fli-Rite School of Aviation," headed by Harold Pugh, who has been field manager for the city for several years, has been turning out civilian pilots by the scores and now, together with the "Northeast Pilot Training School" air fledglings by the hundreds are being trained under contract with some of the largest ports in the U. S.

Runway Design and Construction

The field is located on a low plateau 332 ft. above sea level and situated about 1½ miles east of the city limits. This plateau is underlain by a deep stratum of fine sand of high bearing value as a subgrade. The first runway, built in 1934 with the assistance of W.P.A. labor, involved hauling in considerable river gravel and mixing in place to provide a degree of base

(Continued on page 89)

**Care and Repair
in Shop and Field**

CONSERVATION ROAD

CONSTRUCTION EQUIPMENT MAINTENANCE

A SPECIAL SECTION OF ROADS & STREETS

Equipment Maintenance



A 72x80 ft. field repair shop for heavy units, and an 11-bay building for trucks were none too large for the equipment on this job

Hundreds of Overhauls in This Field Shop

Special equipment facilities needed on desert airport where 700 machines tackled job involving $2\frac{1}{2}$ million cubic yards of earth and $3\frac{1}{2}$ million square yards of paving

ORDINARILY the big word in equipment maintenance is "prevention," and Contractor J. A. Terteling of Boise, Idaho, has always applied the catch-it-before-it-happens technique to the fullest in his servicing and repair methods, as a matter of every-day good business.

But things went far beyond the preventive stage on his big western air base job this past summer.* This huge project, plunked out in a windswept desert, was plagued by dust from the start. Fine, powdery, volcanic mineral soil daily gave a Bronx cheer to dust and oil filters and raised heck with machinery generally. Partly for this reason and also because it was necessary to improvise a good many unobtainable parts, the contractor's field repair shop handled a remarkable volume of work.

Shop Had "Scat" Layout

Like the door with a lot of holes in it so that all the cats could vanish with one "scat," Terteling's main field shop had openings on all sides for speedy, flexible operation. It con-

sisted of parts of three CCC sectional camp buildings, tacked together to make one large shed and given a concrete floor. Alleys were provided for repairing seven tractors at once, or almost any combination of tractor-scraper units and motor graders. There was a special 2-bay wing for handling long trailer-scrappers. This

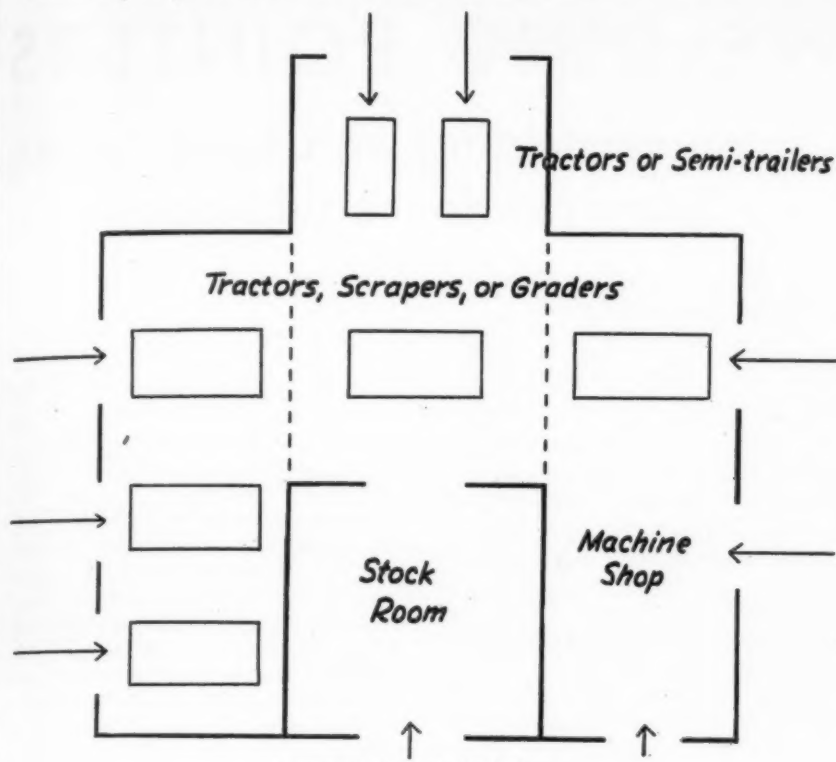
building housed a blacksmith shop, welders, machine shop and parts depot.

A second building, of row-type construction, included eleven stalls for trucks, a well-equipped battery room, and electrical and radiator shops. Oil and grease and greasing equipment were kept in a third smaller building,



Making a new scraper tailgate—typical of shop manufacturing and heavy repair work that A. Terteling & Co. has done on a stepped-up scale since the war

*See *ROADS AND STREETS*, Sept., 1943, for article, "700 Acres of Pavement," describing this project.



Layout of the main field shop

the operating base for greasing trucks.

Shop Was Busy Place

The shop worked three 8-hour shifts much of the time. Under a master mechanic the crew on each shift comprised a foreman, as high as 8 welders, blacksmith, machinist, 25 mechanics, parts man, and 4 to 6 men out on two repair trucks. Seven electric and 10 acetylene welding outfits were kept busy. One man put in full time repairing and soldering radiators. Another rewound armatures and handled all electrical work, doing a great deal of manufacturing of intricate small parts on a "sub" basis with his own tools and equipment set up in a special room on the job.

No attempt can be made to list the

range of parts and units that were salvaged or manufactured in the machine shop. Its equipment, equal to that of many a permanent county or state highway garage, included a medium-sized lathe, drill press, milling machine, power saws, grinder and hydraulic press.

This shop reflected the fact that the whole operation had to be self-contained to a high degree due to the isolated location. The nearest city of any size was 50 miles away. Although the contractor also maintained a permanent shop there and did shuffle back and forth with supplies and hauled an occasional unit in for changing track and special work, the field shop bore the brunt of the mechanical wear and tear.

No effort was made to repair heavy tires on the job. Since tires could

be transported readily, they were repaired and recapped at the contractor's city shop.

Dust, the Saboteur

The contractor slammed into the job long before spring arrived, applying brine solution to the sub-base to permit sheepfoot operations in cold weather. But beginning early, desert dust soon turned the whole repair layout into a hospital for sick motors. Sprinkling trucks shuttled over the long 17-mile haul road where 200 trucks delivered ballast from the nearest pit.

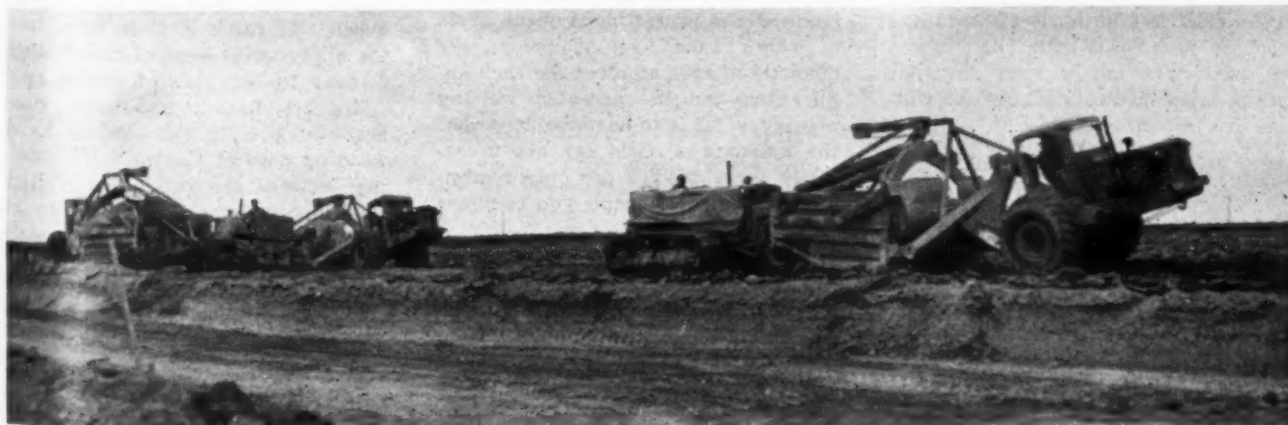
Filters were tied up in cloth. Greasing and oil change intervals were shortened in line with manufacturers' recommendations. But dust still got into the gizzards. More than one fellow on this job still rated it as the worst they had ever encountered from a dust standpoint.

At times when dust wasn't so bad, much motor repairing and semi-teardowns were handled out in the field where the machine broke down. Two repair trucks aided.

Greasing was done with a modern 4-hose service truck. Three men rode the truck on day shifts and two at night, greasing up to 75 or 100 units in a 24-hour day.

Building this air base set something of a record in wear on tractor rollers and for the volume of motor and transmission work in the field. Some crankshafts were metalized in distant cities. The work was speeded up by several special units, including a home-made boring bar for reaming out drawbar hitch blocks on tournapulls and reboring transmission. There also was an outfit for line-boring main engine bearings on all types of heavy-duty equipment—a facility seldom seen out on construction. These units were a vital necessity in view of the volume of teardowns.

As on other big wartime jobs all types and ages of equipment were



Thirty excavating units moved 2,500,000 cu. yds. of material with the help of an intensified servicing routine

pressed into service. Numerous older units were sacrificed to get parts for others. Of interest was the use of three old Caterpillar motors as power units for portable batching and screening plants. One of these is a real old-timer, bearing factory serial number 1C-15, the fifteenth Caterpillar Diesel ever put out. Another was a 1C-57. Conversion of several motors into power units with home-made power take-offs was one of many mechanical chores handled in the shop.

Numerous trucks were wrecked due to drivers going to sleep from long work hours or bad visibility in the dust. (Fifty wrecks, not a man hurt.)

Notes on Electrical Repairs

Distributors were high on the casualty list due to dust. The men found, however, that much trouble could be prevented by tying distributors up in oil soaked rags to keep mineral particles out of the contact points. Otherwise points might not last over half a day.

The electrical shop tested the generators and volt controls of trucks and other units while in for other repairs. Timers were checked frequently, the policy being to set about 10 degrees retarded to keep the high-octane low-lead wartime gasoline from knocking the pistons.

The radiator man had more than the normal volume of work to do because of the high average age of equipment and the large number of green drivers who damaged many machines. His work was hampered by a lack of the proper ratio of tin in "war" solder. Too much lead and too little tin made soldering jobs less secure and required higher temperatures and more painstaking workmanship.

This fellow was quite resourceful. He adapted parts to different makes of equipment, for example, making a Ford tractor generator over to fit an electric welder. When new resistance coils weren't available (they seldom were), he removed them, baking them in an electric oven made by installing heating coils in a little camp stove. He also was handy with magnetic parts, brush pressure plates and voltage control plates.

The electric shop handled an average of 6 truck generators, one magneto, 2 volt controls per 8-hr. working day at the peak, running on all generators and magnetos on a test stand before releasing.

▼
Sidney T. Roebuck, senior member of the Mississippi state highway commission, was elected chairman succeeding Hiram Patterson, who was killed recently in an automobile accident.

WELDING POINTERS

... on rebuilding and hard-facing construction equipment

"HARD-FACE it" is the new wartime watchword in hundreds of contractor, highway department and municipal repair shops.

The following data on this important subject are published with permission from the booklet, "Welding Pointers," issued by Stoodly Company.

Welding with hard-facing alloys is indeed contributing importantly to salvaging and prolonging equipment life. Worn equipment rebuilt and hard-faced lasts as long as new parts, and often longer. Moreover, the rebuilding operation can be repeated again and again, making one part do the work of ten or twenty unprotected parts. And by hard-facing new parts against wear before they are placed in service, operating life is increased 3 to 10 times over ordinary steel equipment. Thus equipment tie-ups are greatly reduced, project completion is speeded and considerable savings in actual cash is often effected.

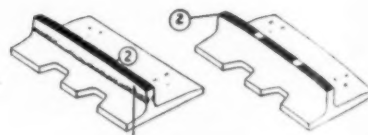
Hard-facing edged tools is especially valuable in keeping construction equipment on the job. Edged tools normally become dull only a short time after they are placed in service, and must be sharpened frequently. But by hard-facing one side and allowing the other to wear away naturally, the tool sharpens itself—and stays sharp as long as the hard metal lasts. Thus, need for sharpening is eliminated, down time is reduced, and less power is required to pull the tool through the earth.

The accompanying table shows the types of hard-facing rods that should be used for protecting typical parts of construction equipment, the amounts of rods required for each application, and the accepted welding procedure. It is to be understood that the amounts of rods are not necessarily accurate, but are only reasonable estimates to enable you to figure job costs.

Tractor Grousers

Type of Rod and Amount

Hard-face with ¼-in. Coated Stoodly Self-Hardening. ¼ to ½ lb. required for a new 22-in. grouser. Apply D.C. electric, reverse polarity, 175-200 amps.



② Stoodly Self-Hardening

Welding Procedure

To rebuild worn grousers place bar of builder's re-inforcing steel (see arrow) on worn grouser cleat. Weld bar to the grouser with Stoodly High Carbon. Protect cleat against abrasive wear with a single pass of ¼-in. Self-Hardening (left sketch). New grousers should be hard-faced with a single layer of ¼-in. Coated Self-Hardening (right sketch). The 1½-in. spaces between the deposits eliminate danger of cracking.

Tractor Track Rails

Type of Rod and Amount

Hard-face with 3/16-in. Coated Self-Hardening. 40 to 70 lbs. required, depending on size of tractor. Apply D.C. electric reverse polarity, 175 amps.



① Stoodly High Carbon
② Stoodly Self-Hardening

Welding Procedure

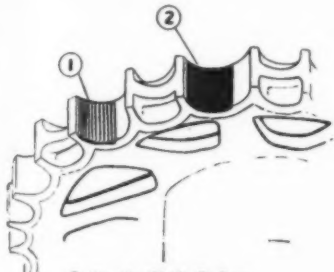
Hard-facing is limited to rails that can be rebuilt to size with a single layer. Lay track out on floor or bench. If track is from large tractor apply guide bead of Stoodly High Carbon to one side of twelve rails. (Step 1.) Return and apply guide bead to opposite sides. (Step 2.) A weaving pass of Coated Self-Hardening between the two beads of High Carbon completes the job. (Step 3.) Peen deposit of each rod vigorously while deposit is still at red heat. When job is completed, check to be sure rail ends have proper clearance. If not, remove excess metal with torch.

Tractor Drive Sprockets

Type of Rod and Amount

Rebuild with 3/16-in. Stoodly High

Carbon. Amount required depends on wear. Apply D.C. electric, reverse polarity, 150 amps. Hard-face with 3/16-in. Coated Stooddy Self-Hardening, 7 to 10 lb. for large sprocket.



① Stooddy High Carbon
② Stooddy Self-Hardening

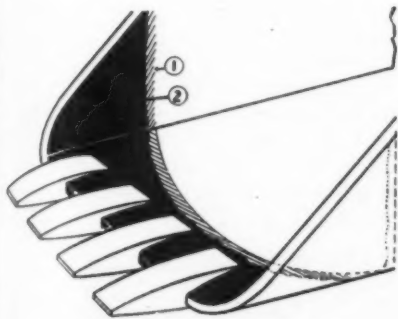
Welding Procedure

Run a shaft through the hub of the sprocket and set ends of shaft on saw horses so sprocket wheel can be easily turned during welding operation. Rebuild areas that are badly worn with High Carbon. Finish with single layer of Coated Self-Hardening. Apply beads transversely. Peen the deposit of each rod.

Buckets

Type of Rod and Amount

Rebuild with 3/16-in. Coated Stooddy Manganese. Hard-face with 3/16-in. Coated Self-Hardening. Amount required of either material depends on size of bucket and extent of wear. Apply D.C. electric, reverse polarity, 175 amps.



① Stooddy Manganese
② Stooddy Self-Hardening

Welding Procedure

Some concerns make it a practice to hard-face bucket lips, runners, and other areas receiving considerable wear before they are placed in service. Others permit sections to wear and then rebuild with Coated Manganese and apply a final layer of Coated Stooddy Self-Hardening. Still others repair worn areas by welding in sections of old grader blades or scrap manganese plate with stainless steel electrodes. These plates are then overlaid with 3/16-in. Coated Self-Hardening. Deposits of both Self-Hardening and Manganese must be

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Repair your broken and worn parts with Manganal—it's the easy, quick and efficient way. Manganal alloy steel welding, wedge bars and chisels give new life to old parts.

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NEWARK, N.J.

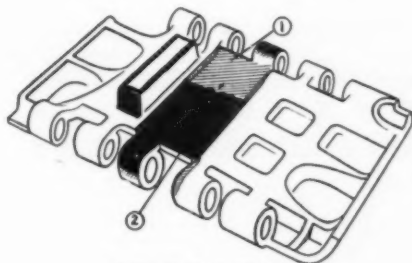


vigorously peened for best results. Sketch shows one method.

Shovel Track Pads

Type of Rod and Amount

Rebuild with either 3/16-in. High Carbon or 3/16-in. Coated Self Hardening. 2 to 3 lbs. required for pad from 2½ yard shovel. Apply either type of rod D.C. electric, reverse polarity, 175 amps.



① Stooddy High Carbon
② Stooddy Self-Hardening

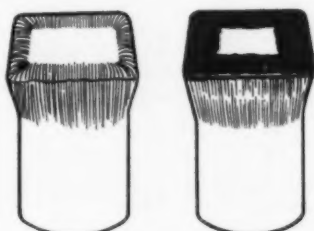
Welding Procedure

Lay track out flat on floor and rebuild pads to original shape and size with either Coated Self-Hardening or High Carbon. Peen deposit of Stooddy Self-Hardening while still at red heat.

Sheepsfoot Roll Tampers

Type of Rod and Amount

Rebuild with 3/16-in. Stooddy High Carbon. Amount depends on wear. Apply D.C. reverse polarity, 150 amps. Hard-face with 3/16-in. Coated Self-Hardening. 3 ounces required for 2-in. x 3-in. tamp. Apply D.C., reverse polarity, 175 amps.



Welding Procedure

If tamps are removable, construct a jig so that tamps can be slipped into position and rebuilt against a copper form. Rebuild tamps to original size and shape with Stooddy High Carbon (left sketch). Apply final layer of Self-Hardening to protect tamps against wear (right sketch). Self-Hardening deposit should be peened while still at red heat. If tamps are stationary it is advisable to hard-face with Coated Self-Hardening before placing in service. The hard metal deposit should be replaced as soon as it wears away to avoid rebuilding.



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EFFORT AND VICTORY!**

**BUT FULLY PREPARED TO
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★ In Trojan equipment you will have machines that will make "after victory" contracts more successful. We are looking forward to the post war era when we can again take care of your normal requirements.

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—look into Magnus Metaffin which is used mixed with lube oil in all kinds of internal combustion engines to prevent formation and accumulation of harmful sludge. Metaffin will also purge motors of built-up sludge deposits.



MAGNUS CLEANERS

KEEP IT CLEAN-- with MAGNUSOL!

Equipment service life depends upon maintenance cleaning just as much as routine adjustments and repairs.

You can keep your equipment clean . . . easily, safely and at negligible cost when you use Magnusol. Magnusol is used mixed one part to eight of kerosene or similar solvent.

SPRAY IT ON—LET SOAK— FLUSH OFF!

That's all there is to cleaning with Magnusol. It takes the "cling" out of all kinds of grease, oil and dirt, penetrating deep into deposits, loosening them so that they are completely flushed away with pressure water. No heat—No steam—No "dead" spots. You get a thorough cleaning job without heavy scrubbing, scraping or brushing.

Magnusol is non-odorous, non-inflammable, non-toxic and mighty economical to use.

MAGNUS CHEMICAL COMPANY

113 South Avenue

Garwood, N. J.

Service Representatives in All Principal Cities.

ium or Coated Self-Hardening, covering area indicated in the sketch. Where Self-Hardening is used, peen deposit of each rod. DO NOT PEEN ELECTRIC TUBE BORUM DEPOSITS.

Remember When Equipment Garages Looked Like This?

From the New Jersey highway department comes this photograph of an old equipment shed once used at Monmouth Junction, N. J. In commenting on it, the department's magazine said:

"Men who have witnessed this evolution of the last 25 years, such as Harvey Butterfoss, to whom we are indebted for the picture, Robert Martin, Joseph Havran, Willard Emmons, Fred Boulden and Morris Hunt, are unanimous in their enthusiasm for the progress made. Perhaps, once in a while, there is a note of nostalgia in their voices as they recall such instances as the day when a few men, armed with picks and shovels, loaded a barrel or two of tar into one of the trucks and started off to repair a piece of road. That was the beginning of the Maintenance Division.

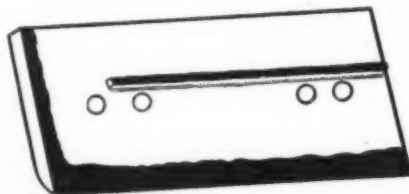
"Or the time Butterfoss rigged a plank scraper to the front of one of the trucks and pushed snow from a New Jersey highway for the first time.

"Memories such as these are the foundation of tradition, but it is well to remember that 25 years from now folks will look back just as fondly to the 'good old days' of 1943—or maybe laugh a bit at the modern trucks of today."

Bulldozer End Plates (Tips)

Type of Rod and Amount

Hard-face with either 3/16-in. Coated Self-Hardening or 3/16-in. 20-30 Electric Tube Borium. Apply Stooddy Self-Hardening D.C. electric, reverse polarity, 175 amps. Apply Electric Tube Borium D.C. electric, straight polarity, 150 amps. Amount required, 6 to 10 ounces for one bulldozer end.



Welding Procedure

Place bulldozer tip in flat position and apply either Electric Tube Bor-

TRANSITS and LEVELS

HEADQUARTERS for REPAIRS—any make

We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.

Write for new Catalogue RS-810 of Engineering Instruments, Engineering Field Equipment and Drafting Room Supplies.

WARREN-KNIGHT CO.

Mfrs. of Sterling Transits & Levels
136 N. 12th St. • Philadelphia, Pa.



Old equipment shed once used at Monmouth Junction, N. J.

How to Get the Most Out of Your Portable Air Compressor

(From Compressed Air Institute, Educational Committee)

Probably the best two suggestions which can be made to insure a long and trouble-free life for your air compressor unit are these:

1. Assign some one person on your staff to be responsible for its operation:
2. Have that man read and study the manufacturer's instruction book carefully before even attempting to start the unit up.

While portable compressors usually undergo a "break-in run" at the factory, don't start working against full load

Listen Gertrude, I can go just so far. I can't store up this dust and grit forever. A lot of it is getting into the air line, Why don't they clean me out?



Air filters should be inspected and cleaned frequently

immediately. Most units, when factory test is completed, are slushed with heavy oil to prevent rust in case they are stored long before being put to work. A good run on the engine, without compressor load, will clear out this oil and help prevent fouling of plugs and gumming of piston rings. Another run, with all the compressor discharge and cooler valves open, will prevent compressor valve carbonizing and assist in maintaining high compression efficiency.

Be sure that the correct grade of high quality lubricating oil is used. Follow the manufacturer's instructions on oil and frequency of changes. There is nothing as destructive and expensive as inadequate lubricant or poor quality oil.



Any old oil is a saboteur

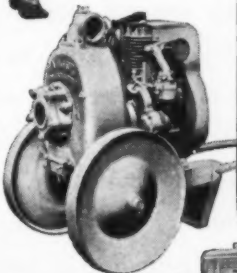
the PUMPS that EXCEED their PROMISES



JAEGER "SURE-PRIME"



Portable 3000 Gallon "Bantam"

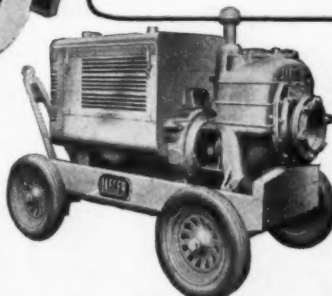


Above: 3" Heavy Duty Model

Right: 10" Portable Pump

All sizes 1 1/2" to 10" — Gas, Electric, Diesel

Also Jetting Pumps



Patented "Priming Jet"

Self-Cleaning Shells

Replaceable Liners

Longest Life Seal

Oversize Shafts

for Years the **ONLY** Pumps that have been **Factory-Tested and Certified and Regularly Exceed Their Guarantee**

- with up to 5 times faster, 100% automatic priming,
- with high air and water capacity under adverse conditions,
- with thousands of extra hours of trouble-free service.

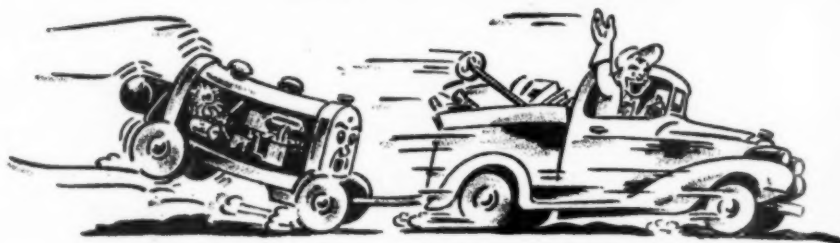
ON SALVAGE WORK AT PEARL HARBOR (where Jaeger 10" Pumps of 40,000,000 gallons daily capacity worked constantly for 10 months) and thousands of other war jobs at home and abroad, Jaeger Pumps are "going places" for you and Uncle Sam. Your Jaeger dealer has them for sale or rent.

Repair Parts and Quick Service in Over 100 Cities
THE JAEGER MACHINE COMPANY
223 Dublin Avenue, Columbus 16, Ohio

Follow printed instructions relative to servicing air cleaners on compressor and engine inlets. Check them frequently. A dirty air filter on the engine will cut down power and increase fuel consumption while clogged compressor air filters will cut the capacity of the machine and make it run hot.

Frequent and regular servicing of the oil cleaners will keep lines clear, insure adequate lubrication, and prevent costly breakdowns.

Keep the machine tightened up. A portable compressor, even when towed at no more than the recommended speed, will often loosen up. Trace



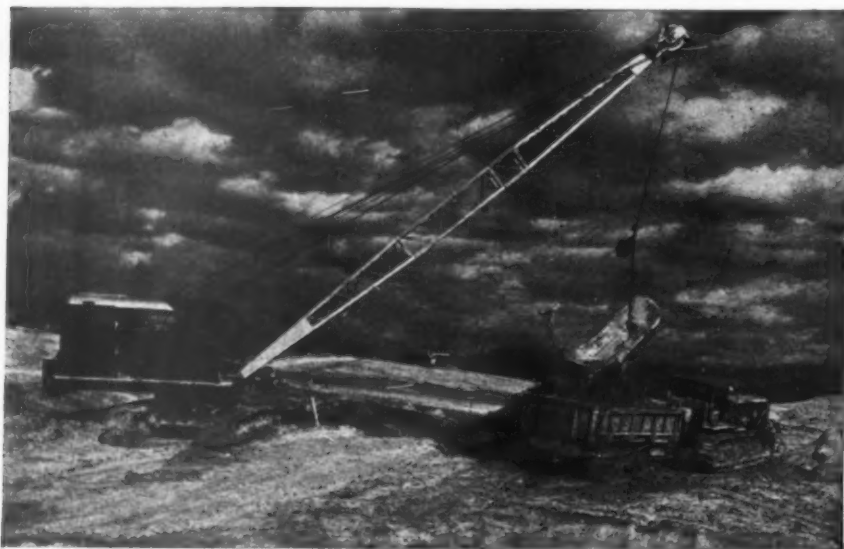
If you want to break down a portable compressor—break a speed record

down any rattle and be sure that all the nuts and studs are tight. To minimize this possible source of

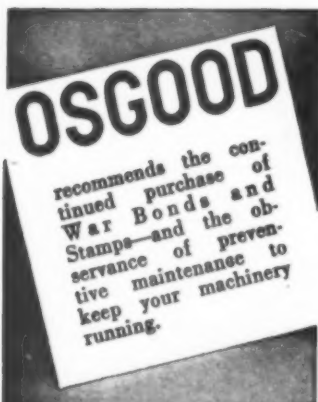
trouble, stay within reasonable towing speeds, i.e., if steel-wheel-mounted, keep under 10 mph; if rubber tired, without springs, under 15 mph; and if pneumatic tired, with springs, within 30 mph.

When service is required, if you do not know how to make an adjustment, call a field representative and let him show you what to do. It will be cheapest in the long run to get the job done right. If service isn't available, read the instruction book carefully before undertaking even the simplest job. One wrong adjustment might ruin the machine's performance.

If and when the portable is stored, follow good commonsense rules. Drain the cooling water, flush the cooling system, and put in a good rust inhibitor. Drain and flush the crank cases and slush the machine with a good rustproof lubricant. Drain all tanks, paint exposed finished surfaces with a dried grease.



OSGOOD AIR CONTROL



The
GENERAL
EXCAVATOR CO.

Sizes: 1-1/2 to 12 Tons
Diesel Gas Electric

Associated with
THE OSGOOD CO.

The
HERCULES
COMPANY

HERCULES
"IRON ROLLERS"
6 to 12 Tons
Diesel or Gasoline

Associated with
THE OSGOOD CO.

the smooth, velvety, effortless control force with the operating ease and efficiency of steam. OSGOOD Air Control is simple in operation, easy to maintain, and costs next to nothing. Even though our production schedule is full—now is a good time to check on OSGOOD Air Control.



Tire Inflation Rack

Inflating big tires is a job not without some hazard, as anyone who has been in this close range of a blowout can testify. The accompanying photograph shows a sturdy iron-pipe "prison" built by the Massachusetts state highway maintenance forces to protect workers handling heavy-duty wheels. Photo courtesy J. E. Lawrence, maintenance engineer.



Massachusetts tire rack



Three weeks later—rough runway grading largely done

(Continued from page 80)

stabilization. This gravel material mixed with the natural sand soil and about 100 lbs. of crushed stone per sq. yd. provided a base course of approximately 4½ in. (compressed thickness) which was stabilized with emulsified asphalt, using only 1¼ gal. per sq. yd. plus a "flit coat" of 1/10 gal. per sq. yd. Constructing the surface course consisted of 1½ in. asphalt "armorcoat" penetration using only 1¼ gal. per sq. yd. plus ¼ gal. per sq. yd. for seal coat the following year. This strip was surface-treated in 1941.

The second runway together with widening and lengthening of previous construction, all of which was constructed by city forces and equipment with the aid of W.P.A. labor, is of similar cross-section, and has been found adequate for heaviest planes. This work was constructed with materials supplied from the municipally-owned asphalt plant, gravel pit and quarry.

The third and latest of the present runways (N.W./S.E.) completed in 1941, was a contract job by Warren Bros. Roads Co., consisting of 6 in. of emulsified asphalt stabilized base and 3 in. of cold plant mix, and is the only contract job constructed at the airport during the period of more than 20 years of development.

Drainage of Widened Runways

The field is underdrained with asphalt-coated corrugated perforated metal pipe varying in size from 6 in. to 18 in. in diameter. One runway, now widened to 150 ft., is still served by the pipe as installed along the edges of the original 100 ft. of width. Another runway has new parallel drains at the edges of the widening, as well as the original lines. The drains are backfilled with stone, but are not however designed as French drains; the porous backfill in most cases is top-sealed by laying tar paper or old burlap bags, as a base for sod and as a means of preventing clog-

ging with infiltrated topsoil. All drains discharge on to city owned land which forms a natural drain to the Winooski River close by. The drainage system includes catch basins spaced approximately 250 ft. apart, constructed of concrete, with a sump for collecting sand and a "weep hole" in the bottom of each to allow water to drain out after rain storms when the ground water level is low. Small amounts of rock salt are put into burlap bags and left in each C. B. sump each winter to prevent freezing of the drain. This forms a brine and gradually filters through the system during short periods of thawing.

Miscellaneous Notes

All runways were built with the aid of simple equipment such as every city street department has, plus farm harrows, both disc and spring-tooth, for mixing the stabilized base. These runways have withstood the rigorous winters with frost depths of 4 to 5 ft. and 30° below zero as well as intense summer heat of 90° F. and abrupt changes in temperature during the

fall and spring seasons with constant use and no failures.

Snow removal has always been done by the street department forces and equipment, the cost of which has been borne by the operating airlines and the street department on a prearranged agreement. Plans are now being made however, whereby the Airport Commission will be directly responsible for the removal of snow as well as all other maintenance items and will make arrangements with the street department or provide some other means for snow removal before the winter season sets in, and will make new agreements with the operating airlines as to the portion of expense each will bear.

Expenditure since 1920 totals about \$182,000 of municipal funds, including labor charges; \$600,000 federal aid; \$8,000 state funds toward purchase of land in cooperation with the city; and \$135,000 for radio beam towers, and other structures off the municipal airport area. Also Northeast Airlines this spring built a new \$100,000 hangar, and the CAA lighting system represents a further \$20,000 investment. New C.A.A. appropriation of \$135,000 for 1943.

The annual appropriation for general maintenance and running expense averages about \$1,500. Income from other sources such as hangar rents, concessions, etc., are used for maintenance expense in addition to annual appropriation.

Col. Miles Reber has succeeded Col. Lewis A. Pick as U. S. Army Division Engineer at Omaha. Col. Pick, whose new assignment was not disclosed, helped direct the very large airport and other war construction volume recently completed under this division.

EXPENDITURES UP TO JANUARY 1, 1937 CITY ONLY

1929 Municipal Hangar	\$ 8,500.60
1930 Land Purchase	8,636.06
1934 Hangar Floor	1,267.24
1934 Administration Bldg.	10,900.18
1934 N/S Runway	16,341.96
1934 Land Purchase	100.00
1935 E/W Runway	20,000.00

Up to and including 1933 reg. appropriation

5 yr. lease timber land	\$80,878.96
Since 1928—1952 anal.	100.00
Lease was only paid for 2 yrs. and then land was purchased under option. Inc. in item below.**	100.00
1936 WPA	300.00

TOTAL	\$81,370.96
City expenditures—1929-1936	
(1) Reg. appro. gen. expenditures	21,025.92
(2) Purchase land and development	74,098.61**
	\$95,124.53

EXPENDITURES UP TO JANUARY 1, 1937 FEDERAL EXPENDITURE

	Labor	Equipment	Total
CWA	\$ 9,030.24	\$1,420.00	\$ 9,144.44
VERA	112,640.06	5,449.20	118,059.26
WPA	38,320.20	38,320.26
	\$159,990.26	\$5,563.40	\$165,553.96
Total City		\$ 95,124.53	
Total Federal		165,553.96	

Income prior to Dec. 22, 1936

ROADS AND STREETS, October, 1943

New Equipment and Materials

Giant Wagon Dumps Its 25 Ton Load in Seconds

Two newly designed earth moving machines produced and shipped by The Heil Co. are in active service on the Alaska Military Highway and in Mexico. The new units are Heil Trailbuilder and the Heil Bottom-Dump Trailer Wagon. The wagon and its heavy duty wheel tractor is a whopper, 36 feet long and weighing 34,000 pounds, capable of 25-ton loads.



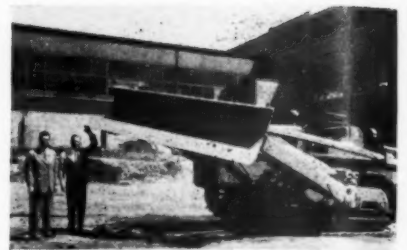
The "bottom dump" system in the Heil wagon is said to be a brand new idea. In all the bottom dump wagons built before, the dump doors swung down, which reduced ground clearance and often makes it difficult for the vehicle to pull away after dumping, and climbing through and over the load it has just dumped.

The new clamshell type bottom dump doors swing up alongside the hopper. The doors, operated by a power driven cable, flash open in two seconds and when they are open the vehicle has more clearance than before it dumped. The doors close automatically by gravity and lock when back in position.

The newly designed Heil Trailbuilder incorporates a number of special features. Blade action is governed by a new perfected power control unit, assuring smooth, positive action, full visibility, minimum cable stress.

Built to work integrally with International's biggest Diesel-powered tractor, the Heil unit is easily and conveniently mounted. Nothing attached to the motor frame and no severe twist or strain on the tractor at any point. It is mounted so that the center of gravity of the equipment is as close as possible to the center of gravity of the tractor, assuring full tractive effort, with no "nosing down."

The moldboard may be reset at desired tilt by removing the combination connecting and locking pin from the front ends of the extension arms.



The blade has a "job-designed" curve, aiding cuts at closely variable depths with no washboarding or gouging. Its drop below ground is unlimited and it may be raised to 55 inches above ground.

Steel-Temp, New Steel Hardening Solution

A product which is said to definitely simplify the hardening of tools and steels and improve the pearlite texture of steel grain after immersion is being manufactured by the Steeltem Chemical Company under the trade name of Steel-temp. It is claimed that this solution hardens the cutting edge of tool steel beyond the point obtainable by ordinary quenching methods and prolongs the life of edge tools. An informative folder on this product is obtainable by addressing this firm at 51 East 42nd Street, New York City.

WILLIAMS Buckets

WELDED ROLLED STEEL CONSTRUCTION

• Welded design formerly used only in steel mill and dredging buckets for heavy duty service is now utilized in *all* Williams Buckets.

ALL TYPES OF CLAMSHELL, DRAGLINE, and CUSTOM-BUILT BUCKETS. $\frac{3}{8}$ to 16½ yd. capacities

**LIGHTER—STRONGER—LESS BREAKAGE
LONGER SERVICE**

Send for free descriptive bulletin which shows clearly why your next bucket should be a Williams.

Built by
**THE WELLMAN
ENGINEERING
COMPANY**

7003 Central Ave. • Cleveland, Ohio

ARMY

NAVY



New Fairbanks-Morse Protected Polyphase Squirrel Cage Motor showing cross-flow ventilation.

New Type All-Purpose "Protectioneered" Motor

Following months of research and practical operation in the field, Fairbanks-Morse has now announced a New type, All-Purpose, Continuous-Duty, Polyphase Squirrel-Cage Induction Motor for use in all kinds of industry.

This new motor is "protectioneered" and according to the company, embodies many special and vital features.

Constructed with the widely recognized and exclusive centrifugally-cast F-M Copperspun Rotor, this new motor is fully protected against flying chips, falling particles, dripping liquids, and other industrial motor hazards. The ball bearings sealed in cartridge-type housings minimize expensive shut-downs due to bearing failures. Crossflow ventilation, a feature in frames 224 to 365 inclusive, is obtained through protected inlets and exhausts at each end of the motor—resulting in uniform cooling and the elimination of hot spots.



New Engine Heater for Cold Weather Starting

A new small compact space heating unit for starting engines in cold weather has been developed by York Heat, Division of Thos. Shipley, Inc., York, Pa. The unit weighs only 38 lb. It is stated to produce 90,000 B.t.u. of heat per hour and utilizes 90% of all the heat units in the burning gasoline it uses for fuel. This product is stated to have an excellent application for heavy equipment such as tractor, shovels, etc.

Minnesota A.G.C. Issues Post-War Booklet

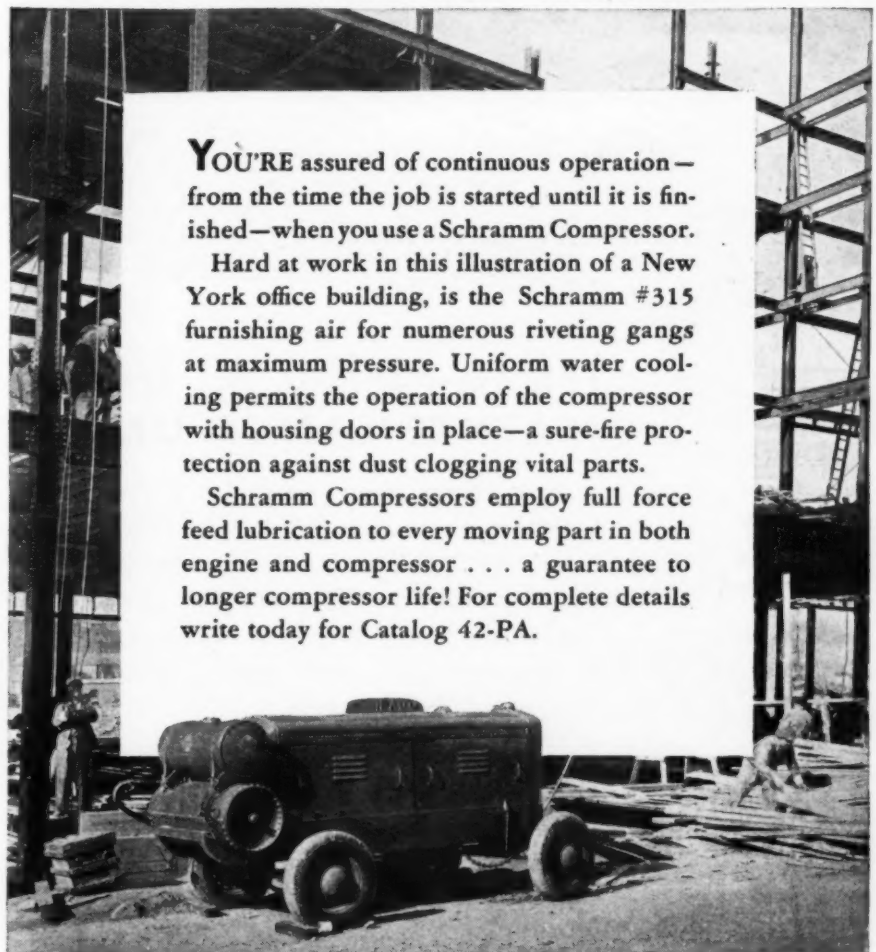
"Post-War Construction and the Taxpayer" is the title of a small booklet that packs a big wallop in its simple presentation of a big story. It is the product of the Associated General Contractors of Minnesota, through its public relations committee comprising C. T. Naugle (chairman), C. F. Sculley and F. B. Winston.

It analyzes and shows with facts and figures the basic part that construction plays in peacetime employment, what this employment means

to the national welfare, how the construction industry compares with other industries as a creator of employment. It shows graphically the importance of experienced contracting organizations in building the complex structures and projects of modern life, and the necessity of the contract system as a means of getting a public construction dollar's worth. The contractor's role in the war and in post-war planning is also covered by this booklet which is worthy of study by everyone in the road business.

Copies available by writing to the Associated General Contractors of Minnesota, 512 Builders Exchange, Minneapolis, Minn.

HERE'S JUST THE AIR COMPRESSOR TO SEE THE JOB FINISHED



YOU'RE assured of continuous operation—from the time the job is started until it is finished—when you use a Schramm Compressor.

Hard at work in this illustration of a New York office building, is the Schramm #315 furnishing air for numerous riveting gangs at maximum pressure. Uniform water cooling permits the operation of the compressor with housing doors in place—a sure-fire protection against dust clogging vital parts.

Schramm Compressors employ full force feed lubrication to every moving part in both engine and compressor . . . a guarantee to longer compressor life! For complete details write today for Catalog 42-PA.

SCHRAMM INC.

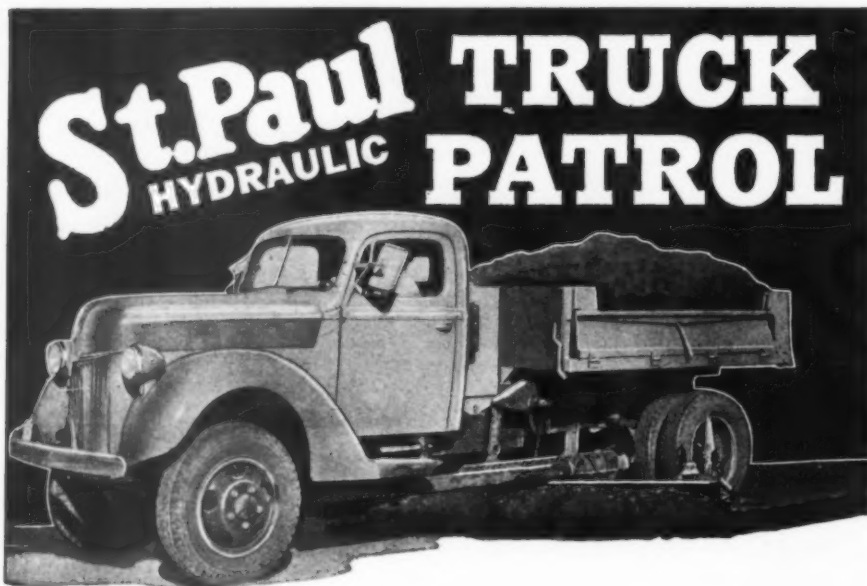
THE COMPRESSOR PEOPLE, WEST CHESTER, PENNSYLVANIA

With the Manufacturers

J. D. Adams Co. Awarded Army-Navy "E"

At a colorful ceremony on August 13, at the company's plant, the Army-Navy "E" was presented to the employees and management of J. D. Adams Manufacturing Company, Indianapolis, Indiana. The award is

based upon production of motor graders, leaning wheel graders, elevating graders, tamping rollers, etc., for the Army, Navy and Marine Corps. In addition to its regular products the company is engaged in the manufacture of gun recoil mechanisms and in the processing of armor plates for tanks.



THE ALL-PURPOSE ALL-SEASON MAINTENANCE UNIT!

Now, more than ever you'll find the St. Paul Hydraulic Truck Patrol the ideal road maintainer. Saves gasoline—saves tires—saves manpower. This one-man operated, single unit, performs over a dozen separate maintenance jobs. That's putting your "maintenance dollars to work!"

Only St. Paul has the patented "Levelizer Control" this means "cutting"—not "scraping" therefore less power is required.

But get the whole story—send for Bulletin No. 37-86 today.

Buy
WAR
BONDS

ST. PAUL HYDRAULIC HOIST CO.

2207 UNIVERSITY AVENUE, S. E.
MINNEAPOLIS, MINNESOTA

ROADS AND STREETS, October, 1943



Fig. 1—Presenting Army-Navy "E"

The illustration (Fig. 1) shows Colonel Harry A. Montgomery of the Supply Division, Office Chief of Engineers, Washington, D. C., presenting the award to Roy E. Adams, Presi-



Fig. 2—Adams Award

dent of the firm. The other illustration (Fig. 2) shows Mr. Adams, Colonel Montgomery, Thomas A. Whited, veteran office employee, and Ralph Harrmann, representing factory employees, holding the Army-Navy "E" pennant presented with the award.

Union Metal Purchases Electrical Apparatus Plant

The Union Metal Manufacturing Company, Canton, Ohio, peacetime manufacturers of steel street lighting standards, pile casings, Mono-tube poles, and materials handling equipment, has purchased the controlling stock of the Superior Switchboard and Devices Company, Canton.

President of the newly purchased firm is C. A. Orr, who is also president of The Union Metal Manufacturing Company. Other Union Metal Executives will hold posts in both firms.

According to Union Metal officials, the Superior Switchboard and Devices Company, which in peacetime manufactures all types of electrical apparatus suitable for use by electric utilities, will continue to produce its present line of war products.

Woman Industrialist Given Unique Recognition

Probably the only woman ever to receive both an Army-Navy "E" and



a Star for excellence in war production is Mrs. E. V. James, president of the D. O. James Manufacturing Company of Chicago, Ill. This company, now busy making speed reducers for landing barges, gears for 155 mm. guns, and other munitions items, in peacetime is a leading manufacturer of many units employed in road building and construction machinery. These include herringbone, spiral bevel, worm and other cut gears, speed reducers for conveyors, flexible couplings.

Myers Made Vice-President of LaPlant-Choate

Recent changes in the organization of LaPlant-Choate Mfg. Co. of Cedar Rapids, Iowa, makers of road machinery and earth moving equipment, include the promotion of Sidney L. Myers as vice-president in charge of export and federal sales. Mr. Myers has been with LaPlant-Choate for twenty years, having been first employed January 21, 1923, as a helper in the factory machine shop. He was later transferred to the position of shipping clerk and then Purchasing Agent. In 1930 he was brought into the Sales Department where he was placed in charge of the Export and Traffic Department, later becoming Export Manager until his present appointment.



S. L. Myers

Wisconsin trunk highway construction or reconstruction through cities of more than 2,500 population is now a responsibility of the State, as a result of a law recently enacted.

Gets Army-Navy "E"

The plant at Toccoa, Ga., of R. G. LeTourneau, Inc., has received the Army-Navy "E" on Aug. 1. The speakers were Brig. Gen. R. F. Fowler, Chief, Division of Supply, U. S. Army Engineers, and Commander George C. Griffin, of the Navy. R. G. LeTourneau, Inc., at Peoria, and our Stockton, Calif. center were similarly honored last January.

McCoy Heads Du Pont Sales

Charles B. McCoy has been named Director of Sales of the Explosives Division, E. I. Du Pont de Nemours

& Company. Mr. McCoy is a chemical engineer, a graduate of the University of Virginia and the Massachusetts Institute of Technology.

He began work for the Du Pont Company in 1928 at the Experimental Station of the Chemical Department. He has had experience in several of the departments of the company including service abroad as a member of the London staff. Since 1940 he has been in charge of Chemical and Miscellaneous Sales.

Mr. McCoy succeeds Samuel G. Baker, who has been made manager of the company's Electroplating Division.



GIVING VICTORY A LIFT

ON highways leading to the far-flung battlefields of the world, Cargo Bodies built by the Hercules Steel Products Company are carrying vital materials of war in unbroken lines to our fighting men and their allies.

Hercules Dump Cargo Bodies, too, are giving dependable service in many camps and on many fronts, both at home and abroad.

With so large a proportion of our capacity occupied by war production, it's only natural that our distributors' stocks of Hercules Dump Bodies should be low. However, when you need new equipment for any essential project or a war contract, the Hercules distributor can take care of you, and the same Hercules representative will keep your present Hercules Hydraulic Hoists and Bodies operating at greatest efficiency, if you'll call on him when you need service.

HERCULES STEEL PRODUCTS COMPANY
GALION, OHIO

REMEMBER THESE FEATURES OF



- Exclusive Center-Lift Action
- Double Bridge-type Lift Arms
- Balanced Piston Valve, with Finger Tip Control
- 6", 7", 8" and 10" Hoists



Whitley B. Moore Heads Timken Sales

Officers of The Timken Roller Bearing Company announced appointment of Whitley B. Moore as Director of Sales for all divisions, including Industrial, Automotive, Railroad, Service-Sales, Steel and Tube, and Rock Bit. He is to be succeeded in his former position of General Manager of Sales of the Timken Steel and Tube Division by C. H. McCollam.

Mr. Moore is a Michigan mechanical engineering graduate and served in the Navy during the last war. He

worked in the Timken Shop Engineering Department until 1921 when he became the company's Western Division Manager. In 1924 he came back to Canton as Assistant General Manager of the Industrial Division, a new department created to develop the expanding uses of Timken Bearings in industrial equipment as distinguished from Automobiles. In 1934 he was made manager of that division, and in 1940 General Manager of Sales, Timken Steel and Tube Division.

C. H. McCollam, a graduate of Can-

ton's McKinley High, came with Timken in 1918 as a control analyst in the company's Chemical and Metallurgical Laboratories. In 1925 he was made Chief Chemist and since has contributed largely to the firm's developments of steel for specialized industries. Since 1940 he has been Assistant General Sales Manager of the Steel and Tube Division.

Name C. T. Ruhf President of Mack Trucks, Inc.

Announcement of the election of C. T. Ruhf as president of Mack Trucks, Inc. has been made by Louis G. Bissell, chairman of the board, at a regular meeting of the board of directors. He has been with Mack since 1912.

Mr. Ruhf had been executive vice president of Mack since last January, following the death of E. C. Fink former president and board chairman. Prior to that time he had been operating vice president in charge of factories.

In 1920 Mr. Ruhf was appointed assistant to the factory manager of the Allentown plant, in which position he served until appointed factory manager in 1937. In 1938 he was made operating vice president in charge of production at the company's plants in Allentown, Pa., Plainfield, N. J. and New Brunswick, N. J. In this capacity he supervised the building of the heavy-duty trucks and prime movers Mack is now supplying the armed forces and also the huge Mack-built transmissions used in many of the Army's 30-ton tanks.



C. T. Ruhf

Loiell Hyler Joins LaPlant-Choate

Loiell Hyler, until recently chief engineer of R. G. LeTourneau, Inc., Peoria, Illinois, has been made Assistant Chief Engineer of LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa. Mr. Hyler had been H. G. LeTourneau's head assistant in product engineering and design for the past seven and a half years. He will be in full charge of scraper development for LaPlant-Choate.



Loiell Hyler



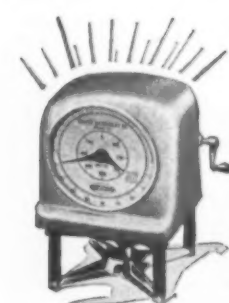
**100 Tons
OF TAR CONCRETE**
Per Hour • Every Hour

H & B PLANT SPEEDS ROAD CONSTRUCTION AT BIG NAVAL TRAINING STATION

With this Hetherington & Berner plant, Dale Engineering Co. (Utica, Syracuse and Rochester, N. Y.) averaged 100 tons of tar concrete per hour—every hour—on a road construction job at the big Naval Training Station at Sampson, New York. When the work day was lengthened from 10 to 12 hours, the daily production was boosted to 1,300 tons. Four black top paving machines were kept busy handling the output of this one plant.

This production is typical of the way in which H & B plants are helping speed the construction and maintenance of roads and bases that are vital to Victory. Write for complete information on H & B portable and stationary asphalt plants.

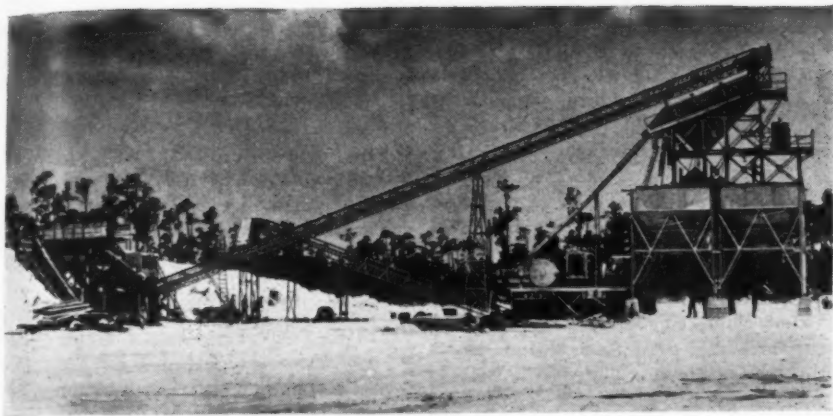
HETHERINGTON & BERNER Inc.
INDIANAPOLIS • INDIANA



THE
"Brass Brain"
(FLUIDOMETER)

This automatic metering system saves time, materials—insures uniformity. For all types of plants.

Hetherington & Berner



Pioneer No. 455 crushing and washing plant

Aggregate Plant for Air Base

Today, when Uncle Sam's War Birds want a landing place, they get it in a hurry. Some unbelievable speed records have been set. One of their main problems is aggregate, and to meet military needs Pioneer Engineering Works of Minneapolis has designed several complete plants. These are flexible operation in gravel or quarry work—they can be used dry or for washing—and they will produce two, three, or four sizes, including sand.

The No. 455 Crushing and Washing Plant shown here is semi-portable, main units mounted on heavy skids for moving on to their foundations. The conveyors have welded side frames and are of bolted knock-down construction.

The Plant shown has produced all the aggregate on two Atlantic air bases on widely separated islands. Because of the portable design and steel construction, it can be quickly moved and set up on the next job. It consists of a 40" x 10' traveling grizzly feeder, which by-passes the fines and controls the feed to a 30" x 42" primary jaw crusher. A 30" x 155' super-service belt conveyor takes the aggregate to a 48" x 16' Vibrating Screen. The material is washed and the sand and water pass into a paddle-type dehydrator. Four steel storage bins receive the finished aggregates. Oversize is discharged from the top deck of screen to a Pioneer 54" x 24" roll crusher. Final crushing is performed in a 40" x 22" roll crusher. "Stone sand" can be produced in the final roll crusher.

Le Roi Company Gets "E"

Le Roi Company, Milwaukee, Wisconsin, was given the Army-Navy "E" Award at a plant ceremony September 14. Brig. General Ray-

mond A. Fowler, Asst. Chief of Engineers, U. S. Army, and Commander

H. O. Lord, Asst. Superintending Civil Engineer, Area V, Chicago, Ill., made the presentation. The firm's president, C. W. Pendock, and Anthony Bieniewski committee co-chairman, accepted in behalf of the employees. Wm. F. Foley was master of ceremonies.



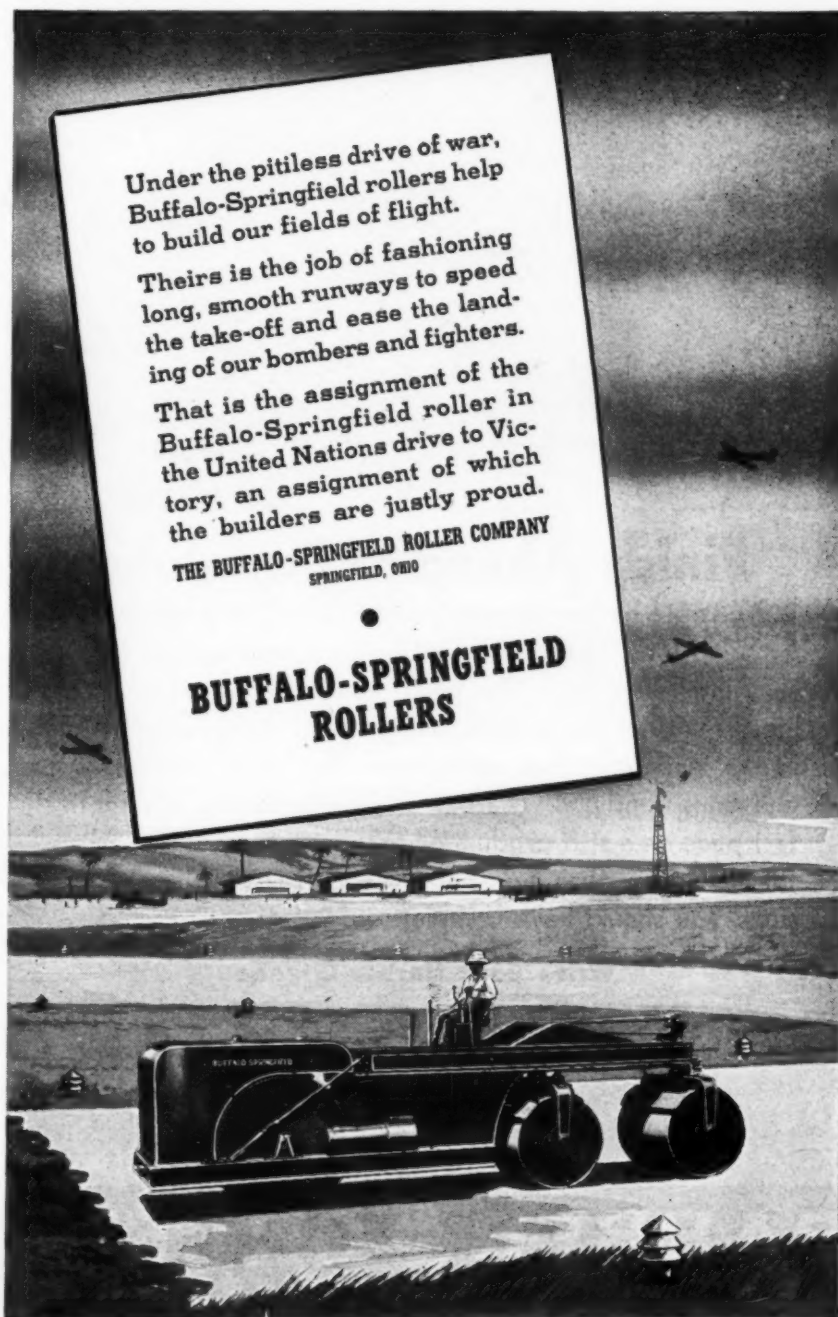
Under the pitiless drive of war,
Buffalo-Springfield rollers help
to build our fields of flight.

Theirs is the job of fashioning
long, smooth runways to speed
the take-off and ease the land-
ing of our bombers and fighters.

That is the assignment of the
Buffalo-Springfield roller in
the United Nations drive to Vic-
tory, an assignment of which
the builders are justly proud.

THE BUFFALO-SPRINGFIELD ROLLER COMPANY
SPRINGFIELD, OHIO

**BUFFALO-SPRINGFIELD
ROLLERS**



Gar Wood Battlefront Giants

Several types of heavy-duty units for battlefront construction, loading,



lifting, etc., are being produced in the war plants of Gar Wood Industries, Inc. Among these units is the very large 6-wheel war truck equipped with telescopic hoist. As shown, it covers a large part of a flat car.

MEETINGS AHEAD

1943 Public Works Congress, American Public Works Association, Hotel Sherman, Chicago, Oct. 24-27, 1943.

* * *

Highway Research Board, 23rd Annual Meeting, Edgewater Beach Hotel, Chicago, Nov. 27-30, 1943.



Finish Ahead of Schedule

HERE is a Barber-Greene Normal Duty Travel Plant working days ahead of schedule on a sand-asphalt job in southern Mississippi. The plant was mixing two yards of loose material per minute, living up to its reputation for speed, economy, and perfection. Operating continuously and consistently, the Barber-Greene is setting a smooth, fast pace on a stiff production schedule. There is no reason for having less than a Barber-Greene. It is available in four sizes. You should have complete information.

H5

**Write your Barber-Greene
Representative for Catalog 848**

BARBER GREENE
AURORA ILLINOIS

American Association of State Highway Officials, Annual meeting, Edgewater Beach Hotel, Chicago, Dec. 1-3, 1943.

* * *

Fall meeting, Texas section, American Society of Civil Engineers, Austin, Texas, October 28-29, 1943. Driskill Hotel, Austin, Texas.

* * *

"PLANNING SMALL BRIDGES FOR POST WAR CONSTRUCTION." A 28-page illustrated data booklet of this title has been compiled by Republic Steel Corporation, Sheet and Strip Steel Sales Division, Cleveland 1, Ohio. It tells how to inventory drainage structures, gives inspection report forms, shows how to rebuild small bridges, how to choose between corrugated iron pipe and arches and how to plan arches and pipe for bridges. Complete with erection data, suggested specifications, typical designs, useful charts and tables. Free on request to the above company.

"CONSTRUCTION SPECIFICATIONS OF THE ASPHALT INSTITUTE." Latest edition of a 260-page reference which includes specifications designed to provide broad, general standards of acceptable methods and materials for assuring satisfactory results. Not intended for specific jobs, but as guides in developing more detailed specifications having generally narrower limits of tolerance. Available on request to the Asphalt Institute at 801 Second Avenue, New York, or any of the Institute's district offices.

"ARE THE UNITED STATES UNITED?" is the title of a 24-page booklet issued by Fruehauf Trailer Company, Detroit, on the subject of trade barriers to motor transport. In preparation nearly two years, this is said to be the first comprehensive study of its kind. In quick, readable style it high-spots the tremendous role of trucking in various fields of industrial hauling, reveals how motor transport is being penalized by restrictive laws (giving specific instances), and suggests a solution of prime interest to the highway construction industry in connection with its postwar planning. The present limited edition is to be followed by a second larger printing for wide distribution. A copy is available free on request to the Fruehauf company.

ROBBINS CONVEYORS, INC., Passaic, New Jersey, has issued a semi-pictorial folder on their line of materials handling equipment, which includes conveyors, material trippers, crushers, skip hoists, grab buckets, traveling bridges and towers, car dumps, etc.

"STUDIES IN ARC WELDING—DESIGN, MANUFACTURING AND CONSTRUCTION." Published by The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio. This notable volume includes 1,300 pages, innumerable illustrations, tables of data and case material on electric welding. Separate sections are devoted to automotive, aircraft, railroad, watercraft, structural, furniture, commercial, container and machinery applications. A. F. Davis and Ed. C. Powers, Editors. Price \$1.50 in U.S.A., and \$2.00 elsewhere, postage prepaid.

"ELEMENTARY SURVEYING." William Horace Rayner, C.E., M.S., Associate Professor of Civil Engineering, University of Illinois. Published by D. Van Nostrand Company, New York, \$3.00. 420 pp., 5x7½ in. pages, designed as a textbook and practical reference.

"CONNECTICUT ROADS." This 48-page non-technical booklet, available in a limited printing, reviews briefly the comprehensive data now available from state-wide planning surveys for a study of the state's future highway needs and means of meeting them. Published by Connecticut State Highway Department, Hartford.

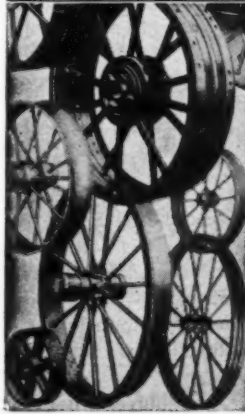
BOOKLET ON PRESSURE TREATED WOOD. Use of pressure-treated wood in the highway field comprises one section of a new book on preserved lumber issued by Koppers Company, Wood Preserving division, which is offered as a guide in material selection for highway engineers and maintenance supervisors. A special section of the book, "Economic and Permanent Construction with Pressure-Treated Wood," explains the several processes by which lumber is treated to protect it against decay, termites, fire, marine borers and acids.

Included on photos of recently completed pressure-treated highway bridges, a prefabricated culvert, and data on the economy and durability. Also reference table of recommended uses of treated lumber for highways and other specialized fields. Booklet available by writing to Koppers Company, Wood Preserving division, Pittsburgh.

"LUBRICATION AND MAINTENANCE GUIDE FOR CONTRACTORS' EQUIPMENT" is the title of a helpful 64-page booklet issued by the Gulf Oil Corporation. This reference includes sections on engine lubrication, superchargers, care of power transmission assembly, cold weather operating hints, storing equipment, and other topics. Copy



IF YOU USE WHEELS or AXLES YOU NEED OUR ENGINEERING EXPERIENCE!



WE have cooperated closely with Industry for more than 50 years—producing millions of dependable, efficient steel wheels and axles; each specifically suited to its task. The knowledge gained through all this experience is available to you now—to help you get the utmost service and satisfaction from your "rolling stock." Write today for complete Illustrated Bulletins.



EWC WHEELS

Electric Wheel Co., Dept. RS, Quincy, Ill.

available without charge on request to the above firm, Gulf Building, Pittsburgh, Pa.

"OFF-THE-JOB ACCIDENTS; THE RELATION OF LIGHT TO SAFETY." 22-page booklet which shows with graphs, charts and statistics the seriousness of the accident problem on streets and highways, particularly after dark. Published by the Lamp Department of the General Electric Company, Nela Park, Cleveland, Ohio, as a contribution to the national effort to conserve war manpower through traffic safety.

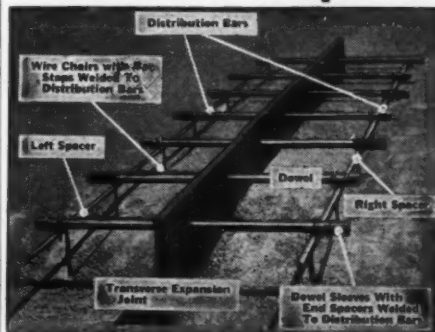
Build Better Runways



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Insure Substantial, Long-Lasting Concrete Runways and Aprons with

LACLEDE Welded Dowel Spacers

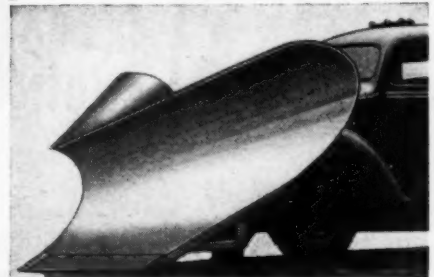


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Accurate — Rigid
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Root V-type and Oneway Truck Snow Plows have helped to keep war industries, Army Camps and Airports open and will continue to do so.

Root has enlisted for the duration and is now running 100% for Victory.

ROOT SPRING SCRAPER CO.

Kalamazoo, Michigan

Builders of Truck Maintenance Equipment for more than 50 Yrs.

CORONACH

*"Of those immortal dead who
live again
In minds made better by their
presence."*

JOHN LEE TILDSLEY, JR., manager of the Chicago branch of Reilly Tar & Chemical Company, of Indianapolis, died in Chicago September 26. He was forty-four years old.

Mr. Tildsley, the son of a retired associate superintendent of schools in New York City, attended Riverdale School and Exeter Academy and was graduated in 1919 from Harvard University. He served as a second lieutenant in the Coast Artillery in the World War. In 1928 he joined the International Combustion, Tar & Chemical Company, and when that company was merged with the Reilly Tar & Chemical in 1933, Mr. Tildsley was sent to Chicago as manager for the Reilly organization.

ARTHUR A. PRENDERGAST, President, Industrial Contracting Co., and Manager A. A. Prendergast & Asso-

ciates, contracting firm of Minneapolis, Minn., died Sept. 8.

He was born in St. Paul in 1861 and was a civil engineering graduate, University of Minnesota.

He was employed as construction engineer by the U. S. Reclamation Service and later by the Great Northern. He then became associated with the Sanitor Construction Company which was later changed to the Industrial Contracting Company. Among the large projects under his direction were Lock No. 7 on the Mississippi river at Dresbach, Minn., and highway bridges across the Mississippi and Missouri rivers.

GEORGE VANG, well known Pittsburgh, Pa., contractor, died Sept. 18. Mr. Vang started business in 1909 with his brother, the late Lewis Vang, with a capital of \$36, directed construction projects amounting to more than \$70,000,000 in his life time.

Among the many bridges which he built are those over the Tennessee river at Chattanooga, Tenn.; Thirty-third street over the Allegheny river, Pittsburgh; Susquehanna river, Clarks Ferry, Pa.; the McKeesport-Duquesne bridge over the Monongahela river, McKeesport; and over the Ohio river at Louisville and Madison.

He purchased control of the Iron City Sand and Gravel Corporation in 1923. He also organized the Ohio River Sand and Gravel Corporation of Parkersburg, W. Va., and acquired a quarry in Fayette county which operates under the name of the Vang Crushed Stone Company. He also organized the Vang Ready Mixed Concrete Company in 1933, and Equipment and Supplies, Inc., in 1935, while continuing active in the construction field. He organized George Vang, Inc., in 1934. He was president of all these companies.

DANIEL M. WHEELER, a member of the first civil engineering class at Massachusetts Institute of Technology, died Sept. 29, at Pittsfield, Mass. He was graduated in 1868. He was born in Rutland, Mass., July 3, 1846.

Following early railroad and public works jobs he became engineering inspector for the Department of Public Works of Massachusetts, a post he retained until his resignation in 1916 at the age of 70.

During recent years he had been chiefly occupied as an inspector of land titles. In performance of his duties he traveled fifty to 100 miles a day on buses, in all weather. He was at work as usual until his fatal illness began on Aug. 17.

✓ Your planning aid
to post-war progress . . .



Trailer engineering can make money for you, too, and in many ways. For instance by enabling full productive time of your crews, minimizing their waste time spent traveling to and from jobs, enabling them to give quicker service, having all their tools for the job, on the job, at the right time.

These, and many other advantages, come to you through proper TRAILER ENGINEERING.

Call on our many years of experience now, for a solution to your product or service problems.

BEN-HUR MFG. COMPANY
634 East Keefe Ave., Milwaukee 12, Wis.

BEN-HUR

INDUSTRIAL TRAILERS

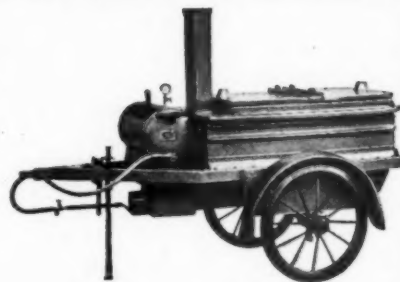


Awarded Army-Navy "E" for excellence of war production

ROADS AND STREETS, October, 1943

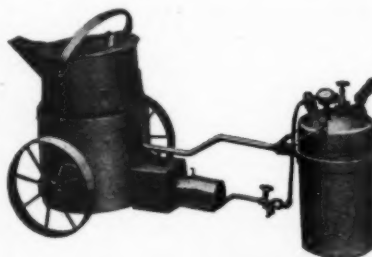
CONNER'S HEATING KETTLE

For speedy
heating of
tar and
asphalt—



Use this CONNER oil-burning Patrol Patching Heater on the *small* job and this CON-

NERY oil-burning kettle for *large-quantity* production.



Write for catalog showing our full line of tar and asphalt heating kettles, spraying attachments, pouring pots, etc.

CONNER CONSTRUCTION Co.
3900 North Second St. Philadelphia, Pa.

ARTHUR C. RERICK, aged 50, Vice-President of E. D. Etnyre & Co. of Oregon, Illinois, died at his home in South Bend, Indiana, following a six months' illness.

Often affectionately called the "Colonel," Mr. Rerick was well-known throughout the road-building industry as the factory representative of his company. Preceding his affiliation with Etnyre in 193 he was associated with the Rumeley Co. of La Porte, Indiana, and later with the Municipal Supply Co. at South Bend, Indiana.

With the "House of Etnyre" he worked nationally with dealer organizations. At time of his death, he was on leave of absence as a member of WPB's Highway Machinery Division. He was a World War I veteran.

WILLARD E. SHEPHERD, prominent Los Angeles equipment dealer, died recently. He was a regional director of the Construction Machinery Branch of WPB. Mr. Shepherd was an employee of the Holt Tractor Company

in his early years and rose to the position of general manager. In 1923 following the Holt-Catepillar merger he became an equipment representative and later organized the Shepherd Tractor and Equipment Company, which he operated until his death.

J. G. Smith New Superintendent Wyoming Highways

J. G. Smith, who has been with the State Highway Department of Wyoming since 1920, has been appointed Superintendent of the department. He is a graduate of Tri-State College, Angola, Ind.

They're In the Army Now

Lt. Col. Victor J. Brown, Public Utilities Officer at the Oklahoma City Airport, has been transferred to similar duties at the airport, Miami, Fla.

Ernest T. Perkins, Assistant Engineer, Bureau of Engineering and Construction, Connecticut State Highway Department, has been commissioned a Lieutenant in the U. S. Army Transportation Corps.

Lieutenant James Garbard, Jr., son of James Garbard, Secretary-Treasurer Gopher Equipment & Supply Co., Minneapolis, Minn., has been awarded the Order of the Purple Heart. He

was wounded recently in action in the North Pacific combat area.

Manuel F. Schiel, formerly Bridge Engineer, Montgomery County, Texas, is now serving with the Army in the South Pacific area.

George Sotham, District Maintenance Supervisor at Klamath Falls, Ore., for the State Highway Department, has been commissioned a First Lieutenant in a Specialist Reserve Branch, U. S. Army Engineers.

H. S. Holtze, Jr., former engineering estimator with H. S. Holtze Construction Co., Sioux City, Ia., is now a First Lieutenant with the Army Corps.

Delbert R. Ward, formerly construction engineer of New Braunfels, Tex., has been promoted to Major at Camp Buckner, N. C., and is now commanding officer of the 2nd Battalion of the 52nd Engineers, Combat Regiment.

Harry Powers, formerly salesman for the Merillat Road Supply Co., of Peoria, Ill., is now Master Sergeant with the U. S. Engineers in Peoria.

I. R. Fisher, former commanding officer, North Carolina Highway Department, Western Patrol Section, has been commissioned a Captain in the U. S. Army and will be engaged in highway safety work with the Army of Occupation.

ASPHALT

for
HIGHWAY WIDENING AND MAINTENANCE



As an emergency measure, highway widening can provide adequate capacity for handling traffic flow increased by defense activity. This saves the delay and expense of constructing new roads which may or may not be required in normal times.

Asphalt construction offers the fastest and simplest method of getting results. Not only can it use local aggregates, but Asphalt can be laid with little interference to traffic.

Wherever Standard Oil Asphalt products are sold, there is an Asphalt representative who can give you full information about these and other uses of Asphalt. Write . . .

STANDARD OIL COMPANY (Indiana)
910 SOUTH MICHIGAN AVENUE, CHICAGO

GRUENDLER CRAFTSMANSHIP

Employed by U. S. A. in the WAR EFFORT

HEAVY DUTY CRUSHING and
GRINDING EQUIPMENT

for—Heavy Ores,
Chemicals, Bauxite
and ROCK Products



Gründler Features
**MOVING TRACK
BREAKER PLATES**
For Wet, Sticky Materials.
**TRAMP METAL
CATCHER**
Full Protection to Crusher.



Developed by Engineers who have made a Life Study of the Hammer Mill Principle for Material Reduction keeping in step with new features to meet the demands for greater efficiency and speed.

Write for our Bulletin on
Large Capacity Hammermills

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GRUENDLER CRUSHER & PULVERIZER CO.
PLANT and MAIN OFFICE—2915-17 N. MARKET • ST. LOUIS, MO.

ROADS AND STREETS, October, 1943



Flink - Faster - Lower Cost Ice Control & Seal-Coating

**SAVED
\$7,000**

A northern city writes:
"We saved about \$7,000
spreading sand alone
our first season. Paid
for the cost of Flink
spreaders nearly 6
times over."

Another city writes,
"Ice is no longer a
problem. Now we get
our intersections covered
fast."

Let us show you these
and other letters.

The truck driver operates the Flink one man spreader. For this reason, and because it spreads faster, one truck with a Flink spreader does as much as 3 trucks with hand shovels . . . an answer to the manpower shortage. The Flink spreader fits all standard dump bodies—does not limit use of truck. Spreads all granular materials up to 1" wet or dry, forward or backward, full width or half width of street. A Flink spreader will pay for itself in 60 days in labor saved—in extra spreading. Write for literature.

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5134 W. Cullom, Chicago
GEO. M. CRAWFORD
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3050 Fremont Street, Columbus



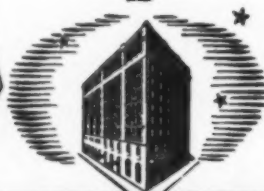
WALNUT AT
FOURTH ST

LOUISVILLE, KY.

Stop at the SEELBACH we'll take care of the REST

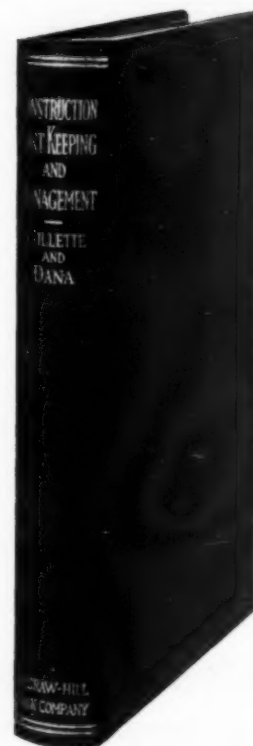
You needn't worry about a thing...check in at the Seelbach and you're sure of a good bed, attentive service, fine food and a friendly atmosphere. You'll awaken in the morning refreshed and ready for a successful day.

500 ROOMS WITH BATH
from **\$2.50**



CONSTRUCTION COST KEEPING AND MANAGEMENT

By **Halbert P. Gillette**
Editor, *ROADS AND STREETS*
and
Richard T. Dana



Rated as one of the "classics," this book was offered in lieu of a revision of Gillette's "Cost Keeping and Management Engineering." It is as good today as the day it was written for engineers, contractors, and construction superintendents who are responsible for efficient management of construction work. By establishing the principles of management its purpose is to assist them in reducing construction costs to minimum. With the exception of the first edition, this is the first book ever published on the subject of cost keeping in construction work. The authors were pioneers in this field, and although they have written many articles for publication in magazines, this book is the first presentation of the subject in a complete and logical sequence.

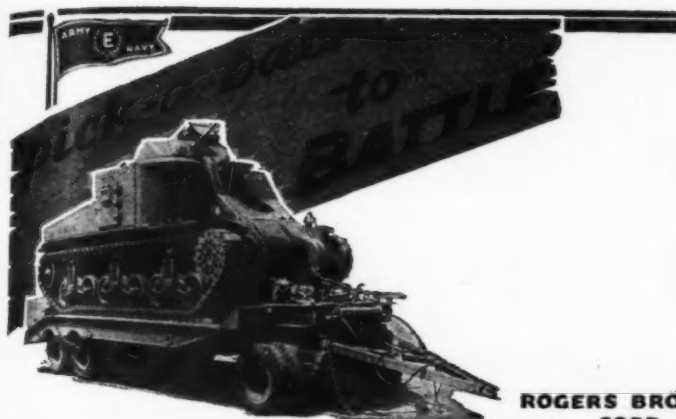
CONTENTS

Laws of Management; Rules for Securing Minimum Costs; Piece Rate, Bonus, and Other Systems of Payment; Measuring the Output of Workmen; Cost Keeping; Cost Keeping as Applied to Highway Construction; Bookkeeping for Small Contractors; Office Appliances and Methods; Miscellaneous Cost Report Blanks and Systems of Cost Keeping; Systems of Cost Keeping.

572 Pages, 5½"x8". 264 ILLUSTRATIONS

Price \$5.00 Plus Postage

GILLETTE PUBLISHING CO.
330 S. Wells St., Chicago, Ill.

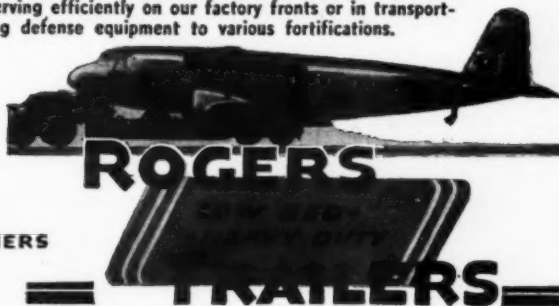


**ROGERS BROTHERS
CORP.**
110 Orchard St.
Albion, Pa.

Tanks produce results only in actual combat on the firing line.

To conserve their fighting capacity they ride to battle on Rogers Trailers, or if damaged are transported to the rear for repairs on a retriever type of trailer especially equipped to load disabled tanks.

Meanwhile, thousands of standard Rogers Trailers are serving efficiently on our factory fronts or in transporting defense equipment to various fortifications.



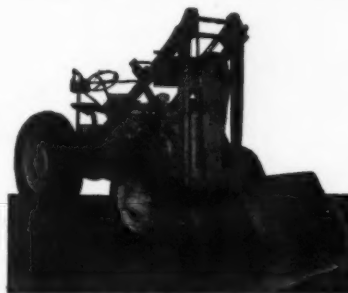
"I-M-P-O-R-T-A-N-T"

RIBBON JOINT should be installed flush with road—rather than under the surface; otherwise, spalling may result.

RIBBON JOINT is superior to a poured joint; it requires no maintenance, lasts indefinitely and prevents water from entering to base.

FLEXIBLE ROAD JOINT MACHINE CO.
WARREN, OHIO, U. S. A.

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Lift

FRONT END SHOVELS

for Industrial Tractors

Write for Catalog

Elkhart White Mfg. Co. Indiana

High Capacity Portable Plant for Gravel and Rock

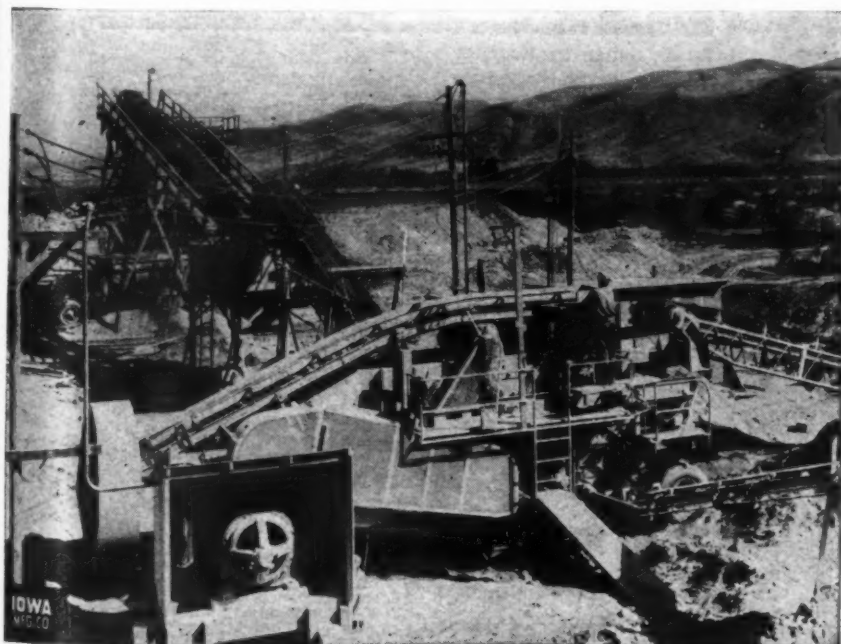
Aggregate producers requiring high plant capacity and mobility will be interested in the Cedarapids Master Tandem Portable Crushing Plant, built by the Iowa Manufacturing Company, Cedar Rapids, Iowa.

Traveling dimensions are 33'-5" long x 8' wide x 12'-10" high. It rides on six cast disc wheels equipped with dual pneumatic tires—has four-wheel brakes.

Engineered for smooth, efficient operation, the Master Tandem consists of matched-output jaw and roll crushers, screen and conveyors, which are perfectly balanced.

Power losses and maintenance are reduced to a minimum with a power transmission system which utilizes no chains, sprockets, or flat belts. Guarded multiple V-belts, universal shafts, enclosed oil-bathed gears, and anti-friction bearings are used throughout. Consequently, only 125 to 150 h.p. is required to operate at capacity.

From a 30" x 50' feed conveyor, material drops to a 30" feeder, which delivers it to a 48" x 12' Cedar Rapids Double Deck Horizontal Vibrating Screen. Largest oversize goes to a



**Cedarapids Master Tandem Portable
Crushing Plant**

Clearing House

EXCEPTIONAL BARGAINS IMMEDIATE SHIPMENT

FOR SALE:

44C Barber-Greene Ditcher.
10S Koehring Mixer on 2 Pneumatic Tires.
4" Rex Self Priming Pump—Gasoline Power.

FOR RENT:

522 Barber-Greene Pneumatic Tired Bucket Loader—Gasoline Power.

PAUL L. MATCHETTE COMPANY

Exclusive Distributors for Barber-Greene Co.

Missouri — Kansas — Oklahoma
20 West 9th Street, Kansas City, Mo.

FOR SALE

3½x25, 5x40 and 6x50 Rotary Dryers
315 ft. Ingersoll-Rand 2 Stage Compressor
1¼ yd. Bucyrus 41B Shovel Attachment
27-E Ransome Dual Drum Paver
2 Ton C. H. & E. Tandem Roller
3—15,000 Gal. Steel Storage Tanks
2 Ton Asphalt Plant
750 and 1000 Gal. Etnyre Distributors
3—Vulcan Nos. 1 and 2 Hammers
1 Yd. Koehring Gas Cat. Crane
110 Ton Blaw-Knox Hatch Bin
20 Ton Ohio Locomotive Crane
1 Yd. B-2 Steam Shovels
15 Ton 100 Ft. Boom Clyde Steel Derrick with 100 H.P. Elec. Hoist
15 Ton Plymouth Gas Locomotive
2—3W & 5W Monaghan Draglines
9B3 and 7 McKiernan Terry Hammers
3 Owen Rock Grapples
16—50 Ton Railroad Flat Cars
2—42B Barber-Greene Bucket Loaders
1 Adams 2 Drum Sheepfoot Roller
1 LaPlante 2 Drum Sheepfoot Roller
R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y.

EQUIPMENT WANTED

Wanted to Buy—Portable Asphalt Plant of 350 to 500 tons capacity. Apply to Phil H. McGuire, Box 34, 35th Street Station, Norfolk, Va.

Wanted to purchase immediately for cash, one, two, three or four cranes each meeting the following requirements: Diesel or gasoline powered crawler type, equipped with one-yard capacity clam shell bucket; not less than 90 HP.; lifting capacity not less than 30,000 pounds at 12 ft. radius; crawler not less than 12 ft. long, 9 ft. 2 in. wide with 24 in. shoes, boom not less than 40 ft. long with new improved plow steel cables; Fairlead with one-yard Paige auto drag bucket, or equal.
These cranes must be in first class condition and not more than eight years old; subject to inspection before purchase. Responses to contain complete information on equipment offered. Communicate with E. A. Julius, Director of Purchases, Chicago Park District, 425 E. 14th Street, Chicago.

ROADS AND STREETS, October, 1943

FOR SALE

Barber-Greene Asphalt Plant complete for Hot or Cold Mixes.

- (1) 333 Barber-Greene Dryer complete with power, cold bucket elevator and plate feeder
Mounted on pneumatic tires
- (1) 342 Barber-Greene pugmill with insulated tank, complete with hot bucket elevator, extra pugmill paddles, small tools and etc.
Mounted on pneumatic tires
- (2) 45 HP. vertical steam boilers, complete with piping
- (1) 3 compartment 35-ton feeder bin with oscillating plate feeders, extra drives and chain complete
Excellent condition
Box 20, Roads and Streets,
330 So. Wells Street, Chicago 6, Ill.

For Sale

Koehring 27-E Concrete Paver Guaranteed Good Condition for Immediate Sale, \$4,-500.00. Can be inspected Portland, Maine, by appointment.

Caye Construction Co.,
356 Fulton St., Brooklyn, N. Y.
or
390 Commercial St., Portland, Me.

FOR RENT OR SALE

No. 4 Northwest Crane and Shovel.
No. 101 Lima Crane, Shovel and Dragline.
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Yard Superintendent or Foreman—Wanted for steady essential employment in small asphalt refining and compounding plant. No technical knowledge required. Experience with pumps and piping, management of men, and general knowledge in this field desirable. Age 25 to 55, preferably draft free. Please write particulars, experience, references, salary expected direct to Asphalt Refining Division, 2310 West Third Street, Cleveland, 13, Ohio.

Tractor Designer Who "Has Something" is looking for cooperation in development of machine for post-war market.
I have in the development stage a tractor that warrants serious consideration from some manufacturer who is shooting at big things after the war.

This machine isn't just something that looks exciting on paper, but a practical machine that has taken a long time and a lot of sweat to work out. It's the product of a man who has learned the earth moving business the hard way, through years as a contractor, construction superintendent and equipment designer.

A moderate-sized machine. Designed for average jobs. Aimed at higher hourly work capacity than any machine heretofore.

Of course I can't tell you all about it here, except to say that it is a crawler semi-trailer affair, capable of speeds up to 30 miles per hour with light or no load. Has four ground contact points for easy maneuverability. Easy on road surfaces and bridges. Because of its principle it will carry a larger load, or the usual loads faster, with a given horsepower.

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Crushers	Bins	Drag-Lines
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LA CROSSE TRAILER & EQUIPT. CO.
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Highway Research Board Meets Nov. 27-30 in Chicago

The Twenty-third Annual Meeting of the Highway Research Board, is to be held this year November 27-30, Edgewater Beach Hotel, Chicago, Illinois. The first two days, will be devoted to committee and department meetings. Sessions of the Board for the presentation and discussion of papers relating to highway finance, economics, design, materials, construction, maintenance, traffic and soils investigations will be held on Monday and Tuesday, November 29 and 30.

According to R. W. Crum, Director of the Board, it is expected that

time and travel facilities will be greatly conserved by holding this meeting contiguous to that of the American Association of State Highway Officials which will be held immediately following at the same hotel.

D. J. Summerville on Wisconsin Highway Commission

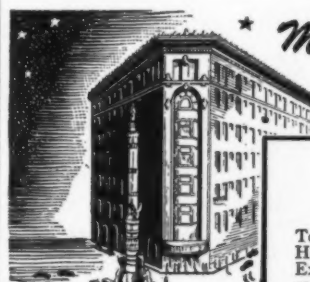
D. J. Summerville, of Ladysmith, Wis., for 19 years highway commissioner of Rush County, has been appointed a member of the Wisconsin State Highway Commission. He succeeds William E. O'Brien, who resigned to become State Director of the War Manpower Commission.

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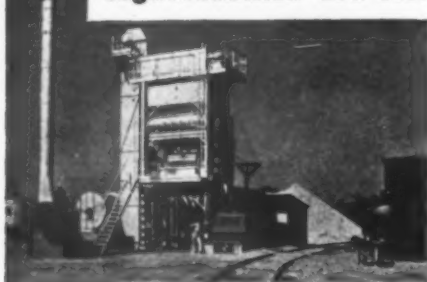
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ROADS AND STREETS, October, 1943

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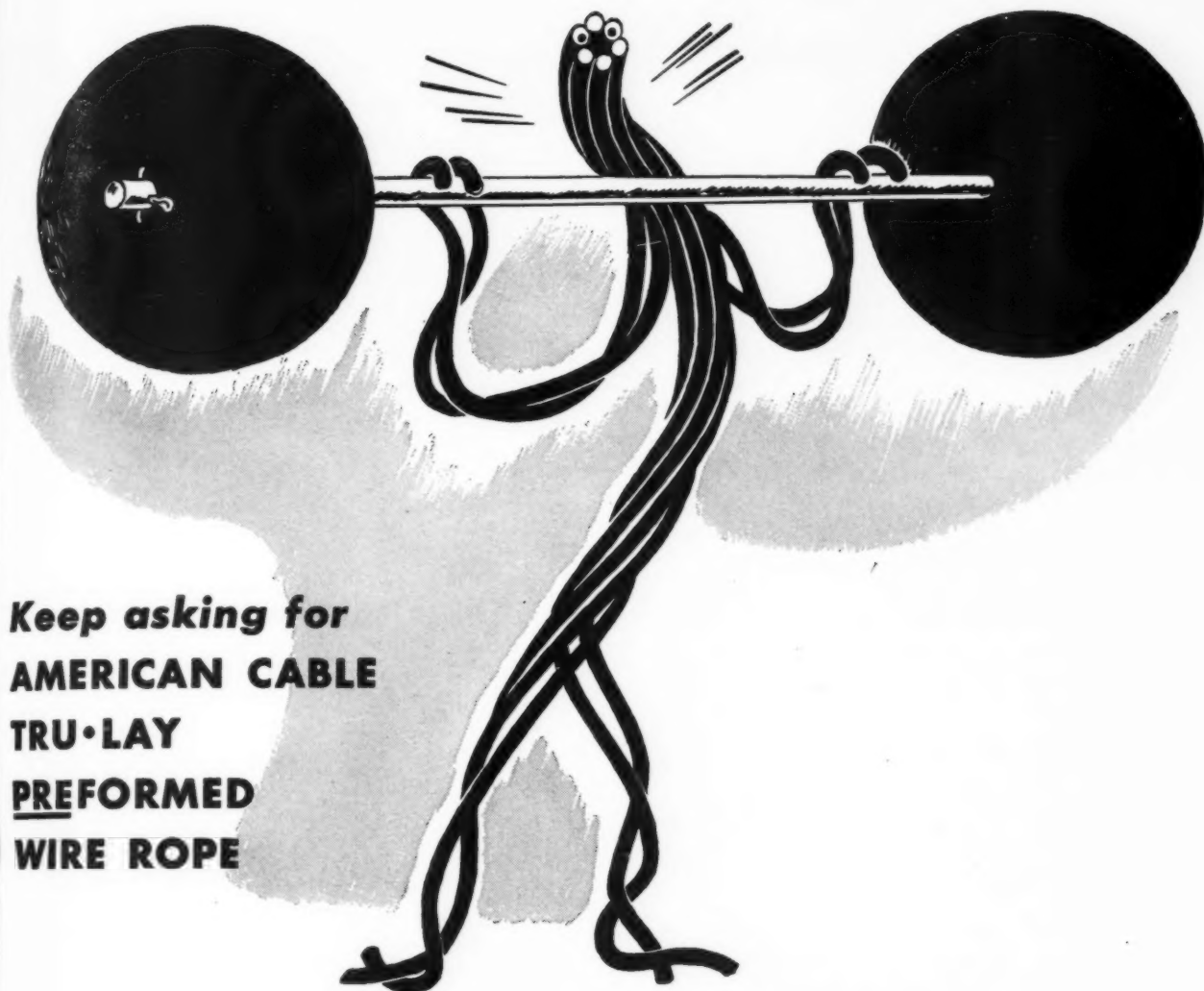
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